APRIL, 1939

ELECTRICAL SOUTH

UNIVERSITY OF FLORIDA

HOWARD L DAYTON..
MANAGING DIRECTOR

NEW ALBANY HOTEL
ALBANY GEORGIA

WINDSOR HOTEL
AMERICUS GEORGIA

ALBANY and Americus are two of Georgia's most cordial and progressive cities.

Much comfort has been added for the guests now visiting the New Albany and Windsor hotels—under new direction of Howard L. Dayton.

HUNTER latest hotel type 36 inch ceiling fans are installed in every room.

HUNTER FAN & VENTILATING COMPANY, INC.

Factory: FULTON, N. Y.

General Sales Offices:
Memphis, Sterick Bldg.

Eastern Sales Office:
New York, 92 Warren Street

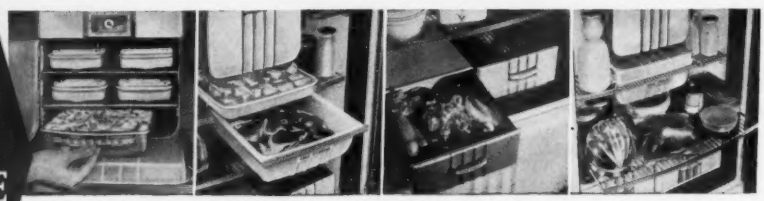
HUNTER Century

Sales Offices:
DALLAS PHILADELPHIA BOSTON
DETROIT CLEVELAND ATLANTA
CHICAGO ST. LOUIS NEW ORLEANS
PITTSBURGH WASHINGTON

IT'S BEAUTIFUL! IT'S THRIFTY! IT'S A BARGAIN!

A Finer G-E Refrigerator with Selective Air Conditions

GET THE INSIDE STORY



SUB-FREEZING STORAGE | LOW TEMPERATURE, HIGH HUMIDITY STORAGE | HIGH HUMIDITY, MODERATE TEMPERATURE STORAGE | SAFETY-ZONE STORAGE

G-E's different *combinations of temperature and humidity* keep foods at their fullest, finest flavor and provide the most practical method of food preservation at low cost. No other refrigerator keeps foods looking and tasting better, or retains more of the health-giving vitamins *longer*, than does the new 1939 G-E.

● Look to General Electric for leadership! FIRST with the *sealed* mechanism! FIRST with an all-steel cabinet! FIRST with stainless steel super-freezer, sliding shelves and other notable contributions! And now G-E gives you *perfected* SELECTIVE AIR CONDITIONS.

"SEE G-E!" That's the hot-tip among refrigerator shoppers this year. The 1939 G-E is jam-packed with new value, new features, new conveniences. It has everything needed for thrifty, convenient, safe preservation of food, *and is priced lower than ever before.*

Here's Why G-E is the Great Value of the Year

1 Selective Air Conditions perfected at world's greatest electrical research laboratories.
2 Stainless steel super-freezer with removable shelf.
3 Fast freezing, easy releasing Quick-Trays.
4 Easily adjustable storage space, sliding shelves.
5 All-steel cabinet, one-piece porcelain interior.
6 Simple, quiet, sealed-in-steel Thrift Unit.
7 Forced-feed lubrication and Oil Cooling.
8 Enduring economy proved by 13-year record.
9 Thrifty in price, in current, in upkeep.

RESEARCH KEEPS G-E YEARS AHEAD!

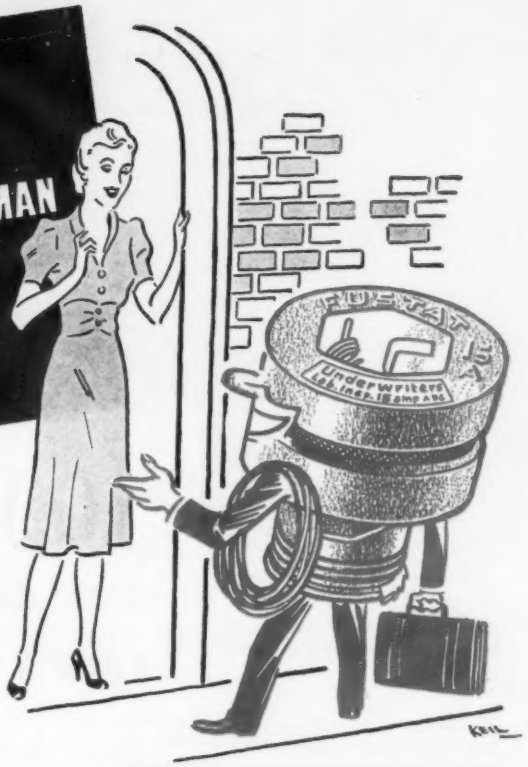
From the famed G-E "House of Magic" came forced-feed lubrication, oil cooling, acoustic mufflers and "floating power." These advanced features of the G-E Thrift Unit assure quiet operation, low current cost and long life. General Electric Co., Specialty Appliance Div., Nela Park, Cleveland, O.

See G-E "House of Magic" at both World Fairs

GENERAL ELECTRIC
Triple-Thrift REFRIGERATORS

GO G-E—ALL THE WAY!
G-E Refrigerators, Ranges, Electric Sink (with Dishwasher and Garbage Disposall), Water Heaters, Washers, Ironers; also "Packaged" Commercial Refrigeration Products.

The FUSTAT is an ADEQUATE WIRING SALESMAN that works for you 24 hours a day



It shows user need for new circuits

Permanent overloading is positively prevented. Once the correct size Fustat has been installed it cannot be replaced with a larger size and bridging it in any way is virtually impossible. If additional circuits are needed the user cannot side-step the issue at the sacrifice of safety.

It reduces low voltage complaints

The user cannot load the circuit beyond the proper capacity of the copper. This prevents a voltage drop that is so frequently the cause of complaints about toasters, percolators and other appliances not operating efficiently.

It permits more outlets per circuit

Adding a maximum number of outlets is a perfectly safe practice because the Fustat guards the circuit against overloading.

It guards against blowing of main fuses

The branch circuit Fustat will almost invariably open on a short-circuit or overload, AHEAD of the main fuse or Fustat — because it cannot be replaced by an oversize fuse or readily tampered. When it does open to protect, only the *normal load* of one circuit is off the line instead of a user possibly having all of his lights and appliances out of service because the main fuse blew.

It permits adding more appliances to present circuits

A circuit can be loaded to approved capacity without needless blows and without sacrifice of safety. The long time-lag of the Fustat keeps it from blowing on motor starting currents or other harmless overloads.

It builds user confidence in doing things electrically

The Fustat helps sell the electrical way of doing things — for it generally permits users to add new appliances without being annoyed by needless blows . . . it assures proper operation of appliances because low-voltage cannot be caused by overloading . . . it reduces chances of users being frightened by shorted cords burning up, for the quick action of the Fustat on dangerous cord shorts—prevents spraying of metal, starting of fires, burning of users . . . it helps teach user that the protective device is a desirable safeguard instead of a nuisance . . . **thus it assists the whole industry to build towards bigger business and better times.**

It's just good business to sell, install and use Fustats

WHAT IS THE FUSTAT?

It is a fuse to which a thermal cutout is added.

It protects like a fuse against short-circuits — even high resistance shorts such as occur in flexible cords.

It protects against permanent overloads, even when as light as 25%.

Retails at 7½c

Yet it will not blow on motor starting currents of washing machines or other appliances.

It has a base that guards against anyone robbing the circuit of protection.

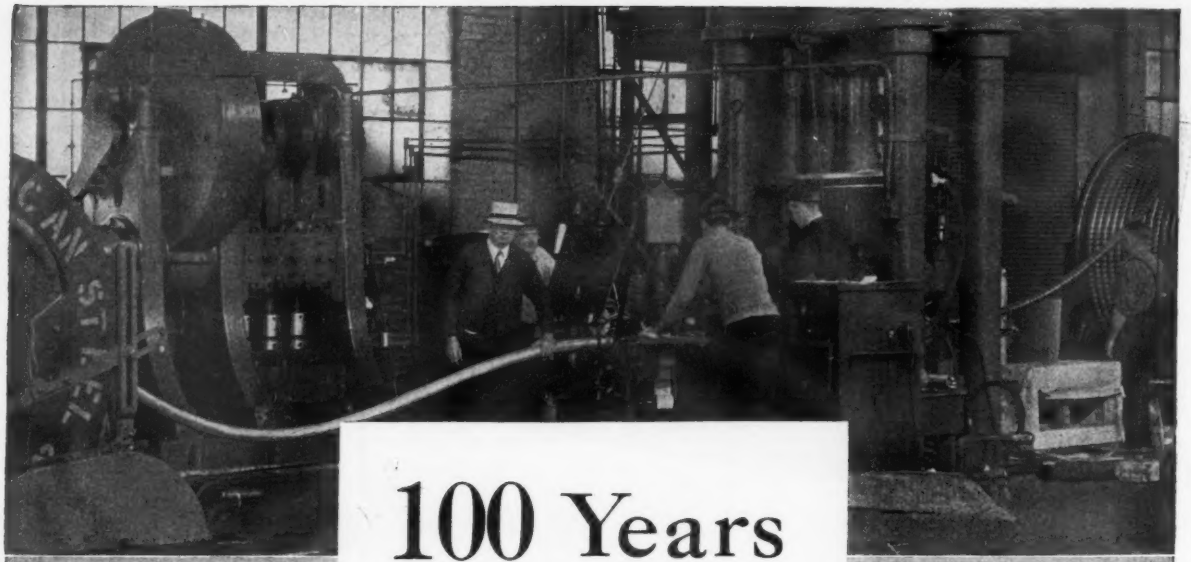
It fits Edison base fuseholders through the use of an inexpensive adapter.

The FUSTAT

For full information write to any of these firms

BUSSMANN MFG. CO., University at Jefferson, St. Louis, Mo.
JEFFERSON ELECTRIC COMPANY, Bellwood, Ill.
KIRKMAN ENGINEERING CORP., 121 Sixth Ave., New York City
NATIONAL ELECTRIC PRODUCTS CORP., Fulton Bldg., Pittsburgh, Pa.
UNION INSULATING CO., 27 Park Place, New York City

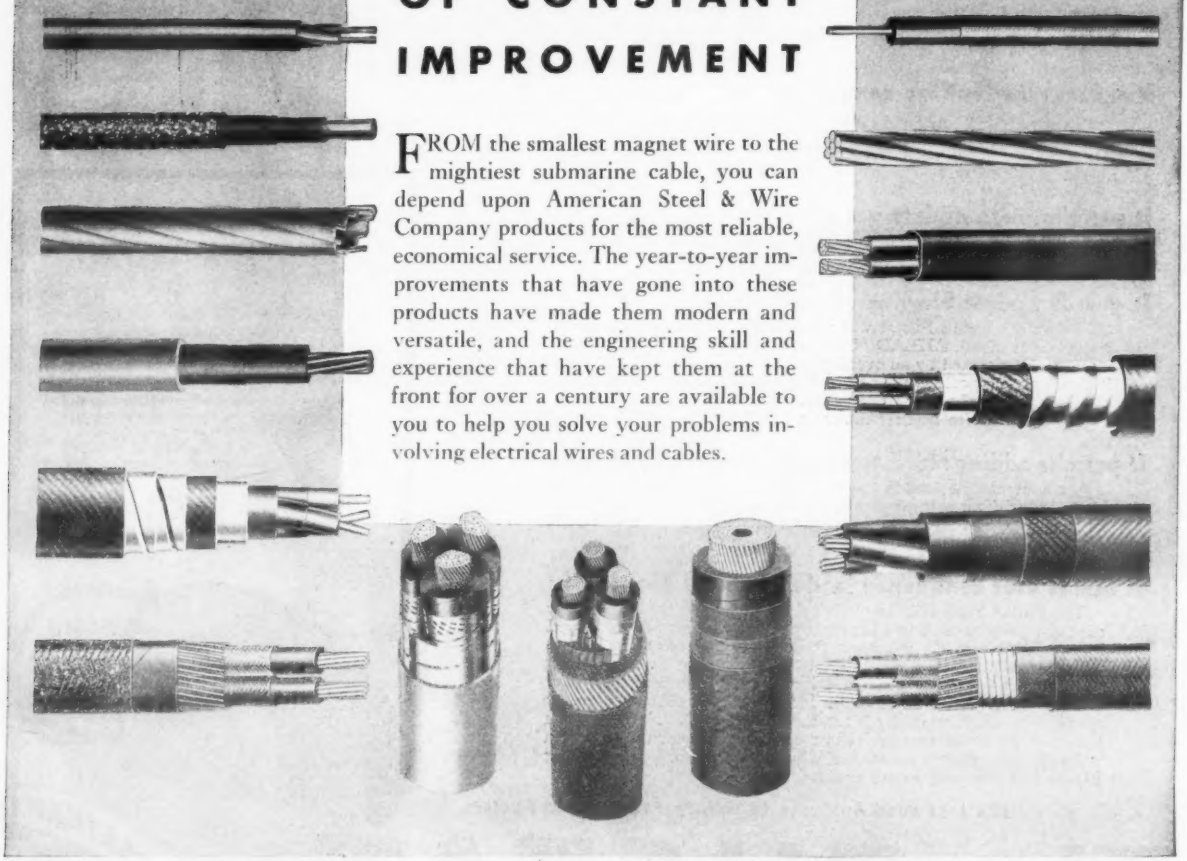
Retails at 7½c
in 15 to 30 amp. sizes



100 Years

OF CONSTANT IMPROVEMENT

FROM the smallest magnet wire to the mightiest submarine cable, you can depend upon American Steel & Wire Company products for the most reliable, economical service. The year-to-year improvements that have gone into these products have made them modern and versatile, and the engineering skill and experience that have kept them at the front for over a century are available to you to help you solve your problems involving electrical wires and cables.



AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* • United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

APRIL, 1939

Volume 19 No. 4

ELECTRICAL SOUTH

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JOHN C. COOK, Sales Promotion Mgr.
W. E. COOGLER, Production Manager

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ATLANTA, GEORGIA

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MEMBER OF A. B. C.

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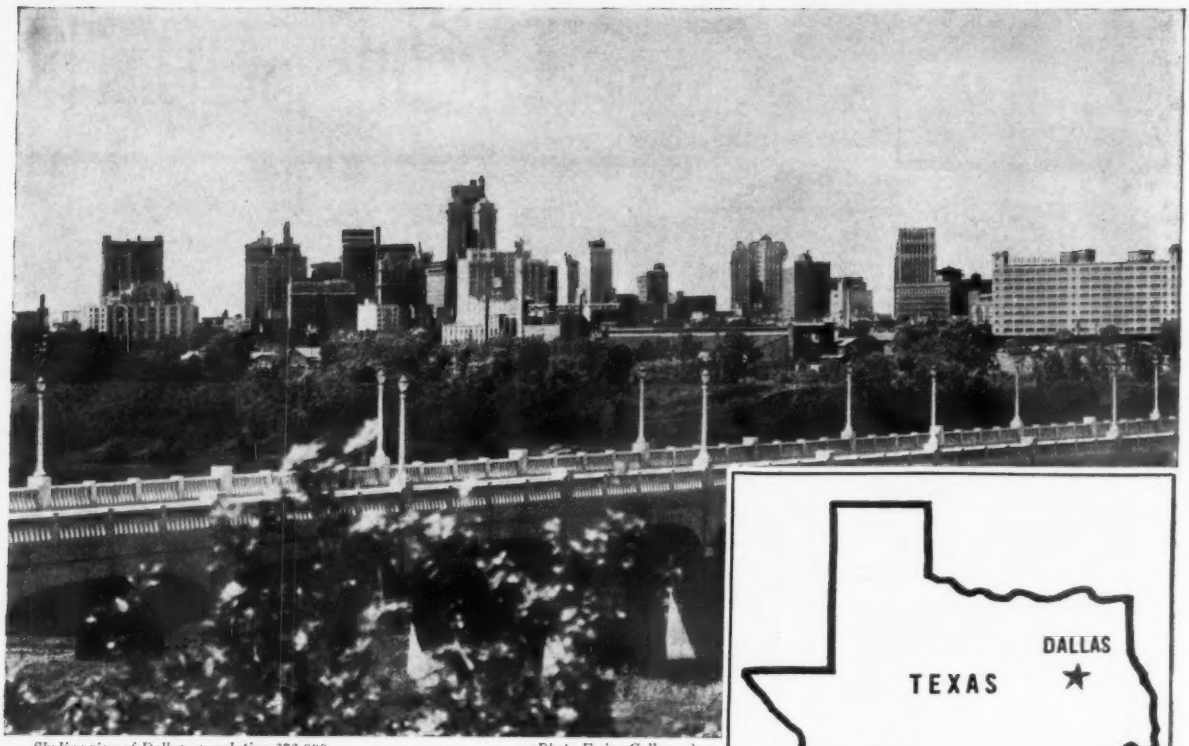


Skyline view of Dallas, population 273,000 (Photo-Ewing Galloway)

Selling lamps and lighting in DALLAS, TEXAS

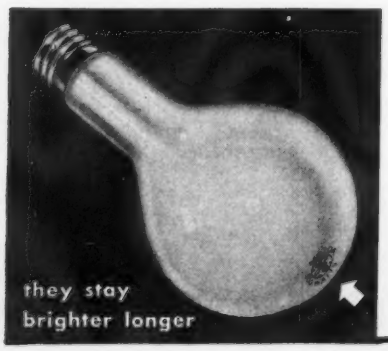
(and cities of similar size)

HERE'S a quick picture of the way that G-E lamp advertising is constantly at work in Dallas, promoting light-conditioning for Better Light-Better Sight. Into Dallas homes every week goes a steady stream of G-E lamp and lighting advertisements amounting to 50 impressions per person in the last ten years.

IN 1939... 960,000 magazines with General Electric lamp advertisements and 310,000 radio messages.

SINCE 1929... 10,128,000 magazines with G-E lamp advertisements.

FALL 1938... 882,000 copies Dallas newspapers with G-E lamp advertisements. **LAST 3 YEARS**... 2,343,000 newspapers with G-E lamp advertisements.



SINCE 1929... 13,711,000 advertisements in magazines, newspapers, and radio. Which is . . . approximately 50 advertising impressions per capita.

IN YOUR CITY. You can easily estimate the approximate number of lamp and lighting advertisements General Electric is delivering to your customers by applying the following national averages:

Going into the average wired home in 1939

14 magazines with G-E lamp ads
5 newspapers with G-E lamp ads
5 radio messages

24 total advertising messages

• • •

In the last 10 years, the average wired home received

158 magazines with G-E lamp ads
30 newspapers with G-E lamp ads
20 radio messages

208 total advertising messages

EDISON MAZDA LAMPS

GENERAL ELECTRIC

NEW ROAD TO REVENUE

R. M. Oliver, chairman of the plan committee, of NEMA's Electric Roaster Group points out a super-highway to increased utility revenue.

UTILITY executives agree that there is a "Road to Revenue." It consists primarily of: (1) Selling increased use of electric service in higher rate brackets and (2) Selling increased use of electric service to the low use unsold customer.

The electrical industry discovered part of the answer to the problem five years ago when a powerful slogan was born and a mighty crusade was launched. Although "Better Light Better Sight" may seem like an old story to us now, the "Better Sight" movement is only six years old and it ushered in a completely new era in electric service. The "Better Light" crusade is performing a great service in human welfare. In addition, it supplies vitally needed revenue to electric service companies.

But is there another route to revenue? Is there a new use for electricity as yet virtually untouched? Is there an approach to the unsold, low use customer equal to "Better Light and Better Sight"? Is there a new, neglected heretofore unrecognized appliance market meeting every stated need of the utility industry today? Is there a new slogan equal, perhaps greater in power than "Better Light—Better Sight?"

The answer is emphatically "yes" which, mighty as it is, the "Better Sight" movement has only partly answered the problems of utilities and satisfied the needs of their customers.

"Easier Cooking"! Millions of homemakers today are awaiting with open arms for some means of lightening the three times a day chore which is woman's lot.

What is the offspring of "Easier Cooking"? The answer is as obvious as it is easy. "Easier Cooking" means in millions of American homes "Easier Living." And here is a slogan "Easier Cooking—Easier Living."

The spearhead of the "Better Light—Better Sight" activity was the development and sale of the I. E. S. "Better Sight" lamp.

And the spearhead of the new electric revenue crusade is— *the electric roaster!*

Today's electric roaster toasts, frys, bakes, grills, roasts, broils—cooks an entire meal at one time electrically and automatically. Millions can enjoy the great benefits of easier electric cooking because of the electric roaster. The inexpensive electric roaster is a practical answer to electric cooking priced for everyone. And for the utility it means revenue.

Fourth Best Load Builder

Let's look for a moment at the revenue picture. According to figures made public by the Edison Electric Institute, the electric roaster ranks fourth as a load builder. Its consumption of 340 kwh per year is exceeded only by that of refrigerators, electric ranges and electric water heaters.

Are you saying "Sure, it does a swell job? It's a swell load builder but what about revenue?"

Like the I. E. S. lamp, electric roasters use current sold at the lighting rate. With the I. E. S. lamp, customers purchase current at high blocks in rate structures. With the electric roaster customers also purchase current at high blocks in rate structure.

R. M. Oliver

Let's look at a typical electric rate of the step-down promotional type. Here we find the utilities selling the first 40 kwh each month at 5 1-2 cents per kwh. The next 60 kwh purchased within the same month at 3 cents per kwh; all over 100 kwh purchased that month at 2 cents per kwh.

Based upon this typical step-down promotional rate, an electric range customer using approximately 176 kwh per month with lighting, refrigeration, cooking and miscellaneous appliances would pay a total monthly bill of $5.52—an average cooking rate of 2 3-10 cents per kwh.

Now let's look at the electric roaster customer. His average monthly use with refrigeration would be 72 kwh. The monthly consumption of the roaster, according to E. E. I. figures, is 28 kwh. This makes a total of 100 kwh per month. At the foregoing rate, this customer would pay a monthly electric bill of $4 and electricity for cooking would be purchased at an average cooking rate of 3 cents per kwh.

Needless to say with the roaster, the utility nor the dealer nor the customer would have any installation cost to pay.

We find on this basis, therefore, the added revenue—the plus of an electric roaster—28 kwh per month at 3 cents per kwh (roaster cooking rate)—84 cents per month—$10.08 per year—and not one cent of added capital investment on the part of the utility company.

Case histories of thousands of roasters sold and in use incontrovertibly prove that every roaster user is a pre-sold electric range prospect. The reason is obvious. Every electric roaster user is sold on electric cooking. She knows what electric cooking will do. She knows for the first time that elec-

tric cooking is practical and economical.

Every utility with an electric cooking rate has a made-to-order, powerful closing argument for an electric range. I wonder how many merchandise men have considered this thoroughly practical approach to electric range selling via the electric roaster? Let the figures tell their own story. The electric range customer whose electric bill we just analyzed paid $5.52 per month for electricity. The electric roaster customer paid $4.00. The difference between these two figures is only $1.52 per month.

In other words, any home now using an electric roaster can enjoy the full benefits of complete electric cooking of the finest type with a modern electric range at an additional monthly expenditure for electricity of only a nickel a day, or $1.52 a month.

Not only do you have in the electric roaster customer a woman who for the first time in her life is thoroughly sold upon the advantages of electric cooking but you also have a woman who has already been paying part of the cost. The additional cost is so slight that it doesn't take a good salesman very long to point out to Mrs. Brown or Mrs. Smith or Mrs. Jones that now that she has this electric roaster in her home she can make a saving of approximately 1 cent per kwh on all electricity she purchases by the addition of an electric range.

Some utilities find it good business to trade in the roaster on a range. Their experience, however, is that not only does Mrs. Consumer purchase the electric range but also that she keeps her electric roaster which means that you, as a utility, have two revenue building devices in her home instead of one.

In other words, the ultimate in "Easier Cooking—Easier Living" is reached with the electric range and the easiest road to electric range sales is with the electric roaster.

Problems Facing Utilities

Two problems face every utility executive today:

1. Selling additional uses for electricity on profitable rate blocks.

2. Selling the low use, unsold residential customer.

The electric roaster satisfies every stated requirement of the utility industry today.

1. It requires no new investment in distribution systems.

2. Its load characteristics are definitely favorable to limited reserve plant capacities.

3. It definitely produces higher net revenues because current to operate it is sold at the high step blocks of the rate structure.

Roaster sales are mounting. With virtually no promotion on the part of either manufacturers or utilities, roaster sales have increased from approximately 50,000 units in 1934 to 250,000 in 1937. Approximately 225,000 roasters were sold last year—a decline of only 10 per cent in sales when virtually every other electrical appliance was on a bobsled headed down hill.

How popular with women are roasters? 1938 figures show that roasters rank fifth in unit sales among all appliances retailing for $20 or more.

What is the unsold markets as of January 1, 1939? According to the Edison Electric Institute, you can still sell roasters to 97 per cent of the wired homes.

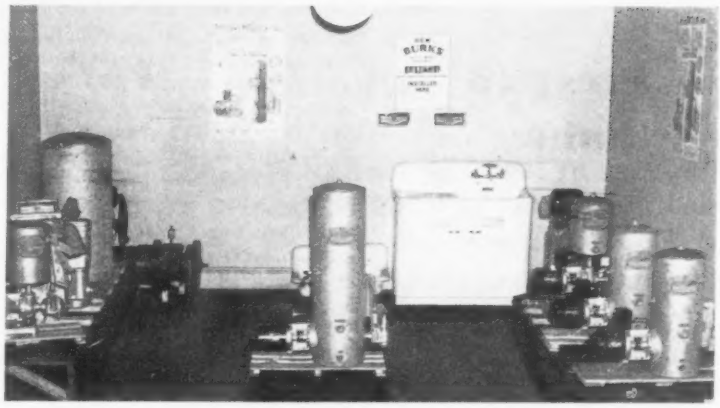
Now is the critical moment in the development of the roaster. The electric roaster has already proved that it has salability and that users are tremendously enthusiastic about it.

To make the roaster a permanently profitable item in merchandising volume and in revenue building, a three-way job must be done.

1. The roaster industry—all roaster manufacturers — must unite in telling nationally the

(*Continued on page* 10)

"Madam, have you tried 'Easier Cooking—Easier Living'?" this pert young lady asks. She is only practising now but hundreds of salespeople will soon be capitalizing to their advantage the tremendous publicity which the Modern Kitchen Bureau is planning for its 1939 roaster campaign.



One of the display booths of the Clinard Electric Co. is devoted entirely to water system display

Prudent Advertising--the Key to Pump Sales

By R. A. Jackson

SELLING electrical water systems is wholly a matter of prudent advertising. B. C. Clinard said recently in discussing the selling methods employed by Clinard Electric Company, of Winston-Salem, one of the largest wholesale and retail dealers of central North Carolina. And his opinions, based on years of successful experience, deserve the attention of all who sell electrical water systems.

Far from being a secret, Clinard said, the "how" of selling is relatively simple, although many pump salesmen have yet to discover its full possibilities.

Until three years ago, he continued, Clinard Electric Company did virtually no advertising of its pumps; and similarly, until three years ago the company did little selling along these lines.

But then Mr. Clinard said he decided to give advertising a trial.

"We did," he exults today, "and in these three years our sales of electrical water systems have increased an hundred-fold."

But, he warned, there is more to advertising than merely placing an ad in the paper. That is only the beginning.

In the first place, he pointed out, there is the matter of advertising within the store itself.

"We handle it this way," he said. "We give the same space to our water systems that we give any of our other appliances. We have booths for each, and we play up each one as best we can, and to its own best advantages."

He pointed out the booths which line the aisle from front entrance to back. Each compartment—fifteen feet wide and fourteen feet deep—is devoted to an advantageous display of a single product.

In one, for instance, there are radios, all sizes and models. In another are electric ranges, and in yet another electric refrigerators.

And in one prominent booth, just as carefully selected and as attractively arranged as the others, are all models and types of water pumps sold by Clinard Electric Company.

Store Displays

"There must be order to this with-in-the-store advertising," Clinard explained. "And there must be attractiveness. If there are not, then the newspaper ads which get our rural customers in here to look around will have been wasted."

Of course, he explained further, it is impossible for every store selling pumps to arrange its advertising as Clinard Electric Company does. He admits the possibility of other stores having arrangements which may be a little more effective than his. But he maintains that his store does—and all others should— get every possible ounce of effectiveness out of the possibilities at hand.

In the display windows facing the street, Clinard follows the same principle, giving water pumps the same advertising space and care as that allotted other appliances—no more, no less. They are all treated with fairness to themselves and to each other, and Mr. Clinard says this principle is sure to get results.

Getting back to the details of newspaper advertising, the manager of the Winston-Salem store said he has found it better to advertise consistently than do it by fits and starts.

"Usually we run one good-sized ad each month. It seems to us better than running smaller adds more frequently.

The large ad every month, he pointed out, is sufficient to attract the attention of prospective customers, and appears frequently enough to keep the name of the company—as well as that of the pump—constantly in the minds of the readers.

"They can see it more easily than if it were smaller, and the time between ads—thirty days—isn't so great that they have to learn it all over again each time they see it," he declared.

An Expanding Field

The field for rural electrical water systems is just now beginning to open up, in Mr. Clinard's opinion. He cited two specific reasons for his belief:

First, the government's rural electrification projects are just now bringing to light thousands of new prospects all over the country, and it bids fair to continue.

Second, recent improvements in the pumps themselves make them much handier for the buyer, and, therefore, easier for the dealer to sell.

He pointed specifically to the fact that today the pump is a "package"—all a dealer has to do is connect wires and pipes, without the former fuss and bother of intricate installation. And, for the same reason, all the buyer has to do is "let 'er run" because the rereduction in number of parts has brought to a minimum the amount of machinery to get out of order.

Sell the Doctors First to Promote Attic Fans

By C. N. Tunnell

DOCTORS do more than influence the diets of people; they influence our living habits; and when the doctors are sold on something that is good for us, they actually help to sell the average consumer."

These comments from G. B. Booth explain his reason for concentrating on the doctors in his city of Beaumont, Texas, to sell them attic cooling and ventilating for their own homes. Mr. Booth is the owner of the firm in Beaumont which bears his name at 990 Fannin Street; and in this city of some 60,000 population, half the doctors are users of attic ventilating systems.

"Strangely enough, it is not always an architect or air conditioning engineer that people consult when they think of home cooling. More often they will ask their doctor about the effects of various types of cooling systems. Doctors frequently have different opinions about air conditioning with refrigerated air," says Mr. Booth, "as some doctors claim that refrigerated air affects people with neuritis and such ailments, but I have never met any doctor who has been anything but a booster for attic ventilating. They know that such cooling will not reduce the inside temperature below the outside temperature, but the movement of air does cause evaporation to give the cooling effect desired.

"We have plugged hard to sell doctors for their own homes. Unconsciously they talk up these systems and many of our best customers have come to us to inquire about a cooling system such as used by some local doctor."

In fact, the Booth Company does not employ any outside salesmen. Mr. Booth personally makes all outside contacts, and most sales are the result of singling out selected prospects and showing them the value and economy of such a home convenience.

The Booth Company has started its third year in attic ventilating; however, last year was the major year with most of the more than 100 systems now in use having been sold last year. During this time, no trouble has been experienced and every system has helped to sell more people on this method of cooling.

"We don't believe in over-selling," says Mr. Booth. "This is a day of guarantees and many people start wanting all sorts of guarantees. We do not promise the impossible. We guarantee the motor for one year for when we make an installation, we use a motor sufficiently large enough to handle the load. For example, a 60-inch fan requires a three-quarter horsepower motor. We tell our prospects that we will guarantee that certain sizes of fans will move the specified volume of air, and we know that our installation will be correct; but we will not guarantee satisfaction because we do not know what it will take to satisfy some customers.

Careful in Guarantees

"The attic ventilating dealer does not have to promise the world and all that goes with it to make sales. And he does not have to make sales that do not protect a profit. We make good sales, profitable sales, and ones that do stand up. Twenty-five per cent of our sales are to people with new buildings . . . we watch the building permits closely or contact people that expect to build and sell them attic ventilating, or at least we get them to provide for it.

"Most homes have two foot attic louvers any way; and by getting the new home builders to provide four foot louvers, we are able to install attic ventilating at any future date without much extra work or cost. And contrary to what many people think, we sell a lot of attic ventilating systems in homes costing as little as $2500.

"We do not find it profitable to spend time and money working on F. H. A. jobs or contacting contractors that are working out of some lumber yard on F. H. A. jobs. But we do contact the better contractors, for they are sold on attic ventilating and on good building even though the house may be only four or five rooms. The cheap contractors discourage anything that runs into money, and the dealer who is trying to sell this class of trade has too much lost motion.

"In addition to contacting the new builders, we work on the people who have already paid for their homes, for they have the money to buy home conveniences. Seventy-five per cent of our sales are for buildings that are not new."

This attic ventilating dealer has a different idea in merchandising this equipment from some dealers. He will sell the system completely installed, and most sales are made this way, but if a prospect desires, he can buy the motor, fan, or any part of the system and make his own installation.

Mr. Booth finds that in his city, which is largely industrial, that there are many people with mechanical hobbies or people who like to build and do things for themselves. These people are as much interested in assemblying a cooling system as they are in the results of the system; and many extra sales are made simply because this dealer will show the man who likes to remodel and work around the house or shop that he can make his own installation.

However, Mr. Booth does show prospects that they can't pick up an $8.00 mail order motor and expect quiet and efficient operation. He qualifies his policy with this: "Although we do sell anybody any part of a system, we also show them that 50 per cent of the efficiency of any attic cooling system depends upon the installation. We show them that the fan propeller is like a boat propeller, depending upon the pitch and balance for best efficiency. We show our prospects that all fan frames are set on sponge rubber to eliminate any noise, and that we use a canvass between the fan frame and the box to take out any vibration. We also show our prospects that we use fuseable links in the ropes that hold up the trap door over the grille in the pent house so that in case of fire the rope gives way and the trap door closes, shutting off the flow of air through the building.

"Another thing we do is to sell time switches with practically all installations. Although we get

(*Continued on page* 40)

"Mr. Power Company"

To thousands of customers of the El Paso Electric Co. the meter readers are the "company." They build load and create goodwill.

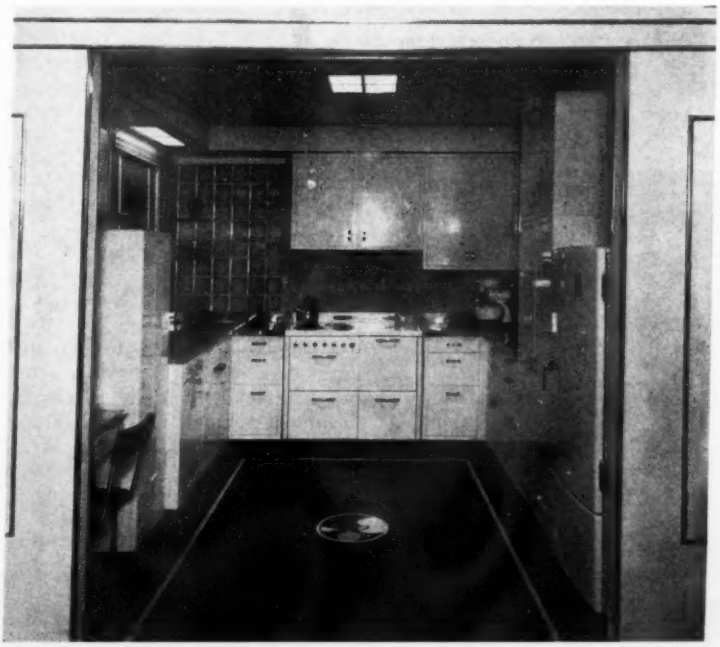
O. W. Amado, one of El Paso Electric Co.'s district representatives who reads meters, adjusts complaints, sells appliances and builds goodwill for the company.

TWENTY years ago electricity consumers anywhere would have been startled to find a young man with the appearance of an *Esquire* clothing ad knocking at their back doors for meter readings. Meter readers of that generation were classified with the repair-men, the ice men, and were not chosen for their personality or sartorial accomplishments.

But meter-reading has been taken out of the class of "rough-and-ready" activity by the El Paso Electric Company, who has combined the duties of meter-checking with appliance selling, and chooses the men for the job with their potentialties of salesmanship and public relations in mind. Many utilities use their meter checkers as "bird dogs" for appliance sales, but few have developed the sales potentials of their meter force as has the El Paso company.

Working under H. A. Walsh, general sales manager for the utility, is A. E. Werner, merchandise sales manager, who directs operations of one of the most complete merchandise departments in any southwestern utility, handling the Westinghouse and Hotpoint lines of refrigerators, ranges, and water heaters, and practically every small appliance as well.

Mr. Werner gathers his meter readers strictly from a sales standpoint, and uses the meter routes merely as a means to an end. Men from 25 to 30 years of age are employed, and put through a period of product training, working full time in the company's display room, under Mr. Werner's supervision, until a vacancy in the field staff appears.



Model kitchen on display floor of El Paso Electric Company.

Mr. Werner has broken down the duties of an outside sales representative into several phases: establishment and maintenance of good will, keeping an accurate record of the presence, age, and condition of various appliances in the consumers' homes, and educating consumers to the cheapness of electricity and the economy of its use. Salesmen are encouraged to establish personal contacts on their meter routes, simply for the good-will value of the contrast between a young, well-dressed, well-spoken man and the uncouth service-man of former days.

Not all of the domestic customers of the El Paso Company are contacted through the district representative plan because in certain localities where the family income bracket and mode of living is very low, experience has indicated that the plan could not be operated profitably. However, 72 per cent of the domestic customers of the company are covered by district representatives. Commercial customers are contacted and

sold through the industrial sales department.

In all, there are fourteen protected districts, with an average of 1,150 domestic meters each. In each of these districts, the representative is "the company" to the customer. He reads the meter, adjusts complaints, builds goodwill, sells appliances, etc.

Each man is assigned a definite protected territory which he must work but he is also allowed to sell in open territory in spare time. Each district representative receives a regular base pay plus a load building bonus. The bonus is paid on dealer sales as well as company sales, but on the latter, the representative also receives a merchandise sales commission.

Repossesions that occur within six monthly payments of the sales are charged back against a district representative, and he loses any commission or bonus, or both, that was paid him at the time of the sale.

This plan of merchandising has been employed now for the past twelve years and has proven very satisfactory to the customer, the company and the sales employee. So far as the company is concerned it has been of real value in building both electric load and better public relations.

The economy of electricity is stressed throughout the company's advertising and public relations, and consumers' attention is called to the low rate prevailing in El Paso which, considering that the average home will consume the first 100 kilowatt hours in lighting and small appliances, brings the power consumption of the major appliances into the 2 cents per kilowatt hour rate. An arbitrary rate of 1 cent per kilowatt hour is established for water-heater use.

Sales promotion for the utility is directed by A. T. Kunz, who originally conceived the idea of serving coffee and cookies to weather-worn customers during the winter months, when they entered the utility offices for bill payment, or any other errand. Both as a good-will feature, and as a stimulant to percolator sales, this practice was a decided success. Type-written copies of the recipe of each type of cookie served were available, including judicious amount of institutional advertising copy.

By carefully selecting all personnel connected in any way with sales or public relations, Mr. Werner states that full advantage of the utility company's entre to the homes via the meter is being taken.

New Road to Greater Utility Revenue

(*Continued from page* 6)

"Easier Cooking—Easier Living" story.

2. Individual manufacturers must back this promotion with strong advertising and aggressive selling of their own brands.

3. Electric utilities must throw the full force of a major activity promotion behind the electric roaster locally.

To do job number one the roaster manufacturers have stepped out with an aggressive three-year consumer advertising program.

The NEMA Electric Roaster Group is now a part of the Modern Kitchen Bureau and is co-operating with electric range manufacturers. The objective of the three-year MKB roaster advertising program is: "To create wide consumer acceptance of the electric roaster as a practical cooking device."

Twenty national magazine advertisements will apear in 1939: The Saturday Evening Post, 3,000,000 circulation, 8 ads; Woman's Home Companion, 2,800,000 circulation, 6 ads; and McCall's, 2,600,000 circulation, 6 ads. When? Saturday Evening Post: May, June, July, October, November and December; Woman's Home Companion: April, June, July, October, November and December; McCall's: March, May, July, September, November and December.

The advertisements will total 8,400,000 circulation, 33,600,000 readers, and 55,800,000 impressions. This amounts to over two impressions per wired home selling "Easier Cooking—Easier Living" to America.

To do job No. 2 each individual roaster manufacturer must undertake an advertising program to popularize his own units.

Jobs 1 and 2 are under way now. Job number 3 is for utilities to throw full weight of a major activity promotion behind the roaster locally. Like the electric iron in 1912, like the electric refrigerator in 1924, like the I. E. S. lamp in 1934, electric roasters are today in the promotional stage of development.

The utility policy must be to promote today—for tomorrow's revenue. The roaster must have:

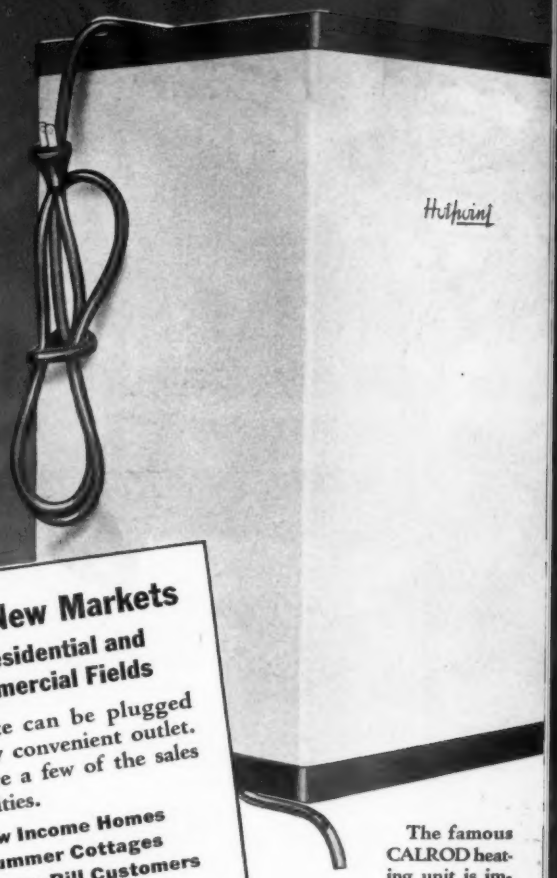
1. The enthusiastic support of top management.
2. Year 'round activity, tying in with Modern Kitchen Bureau and manufacturer programs.
3. Employee ownership and sales support.
4. Intensive local advertising on "Easier Cooking—Easier Living."
5. Continuous retail display.
6. Sales building demonstrations for employees and customers in groups, and in the home.
7. Specialty selling effort during the present state of development—special bonuses to salesmen.
8. Evidence of the satisfaction of users translated into local selling power.

El Paso Electric Co. window display featuring Reddy Kilowatt

Hotpoint

OFFERS A NEW PORTABLE (NON-PRESSURE) WATER HEATER

with Vast New Sales Possibilities



The famous CALROD heating unit is immersed directly in the water. Heats quickly, efficiently, economically.

Let this low-cost, fast-selling Hotpoint Electric Water Heater open your market to profitable water heater sales.

Use Voguette to educate prospects to the safety, cleanliness and dependability of electric water heating and make money at the same time.

Of two gallon capacity, Voguette is easily and quickly installed. It offers the simplest, safest, cheapest method of heating small quantities of water. Costs less than heating water on the range.

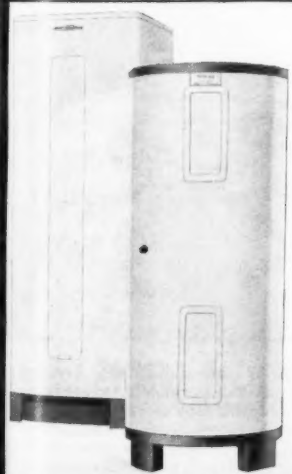
Get all the facts today and use Voguette to cultivate your territory for standard installations of Hotpoint Automatic Electric Water Heaters.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5614 West Taylor Street, Chicago, Illinois

Open New Markets in Residential and Commercial Fields

Voguette can be plugged into any convenient outlet. Here are a few of the sales possibilities.

- Low Income Homes
- Summer Cottages
- Minimum Bill Customers
- Filling Stations
- Soda Fountains
- Tourist Cabins
- Roadside Stands
- Barber Shops
- Small Taverns
- Rest Rooms
- Doctor's Offices
- Dentist's Offices



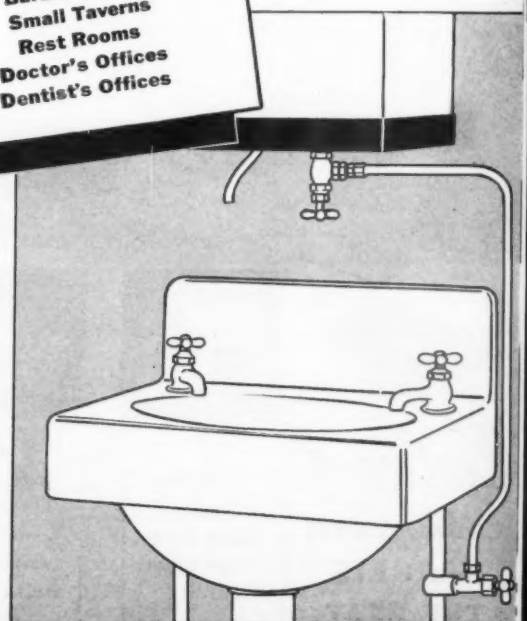
HOTPOINT OFFERS THE MOST COMPLETE LINE

Hotpoint offers a full line of electric water heaters in capacities from 1 to 140 gallons. A size for every need.

THE VOGUE. Hotpoint's popular rectangular-type water heater, smartly-styled for the modern home. Adaptable to kitchen, bathroom or basement installation — and commercial use.

THE MASTER. Hotpoint's famous round-style water heater, finished in white with contrasting black trim. Fully automatic and dependable. Economical to operate.

LEAD WITH HOTPOINT—THE LEADER OF THE INDUSTRY



Voguette simplifies installation. It may be hung above basin sink. Plumbing connections are simple. No special wiring necessary. Just plug into any convenient outlet.

ATER **Hotpoint** HEATERS

BE READY TO REAP THE BENEFITS OF INDUSTRY CAMPAIGN

Tie up with the Modern Kitchen Bureau Water Heater Campaign. Promote Electric Water Heating. Get your share of profitable business. Write for information to The Modern Kitchen Bureau, 420 Lexington Avenue, New York, N. Y.

HERE ARE 2 NEW

BIG VALUES AND

THE MANCHESTER—Hotpoint's Spring sales headliner. Its streamlined styling is especially designed for installation in the modern All-Electric "Ensemble" kitchen. The Manchester is a popular priced range equipped with many of the features of Hotpoint's higher priced models. Full porcelain enamel. Has three 5-Speed Select-A-Heat Calrod units. 6-quart Thrift Cooker. Oversized Directional Heat Oven with Direct-A-Heat switch. Duo-Speed Broiler unit. 3 Large utility drawers. Make this your volume leader.

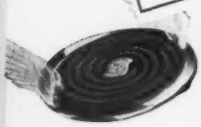
Swing into a big Volume Range Business with these New Hotpoint Models and the Spring Swing Sales Plan

Hotpoint offers two new popular price ranges with high-quality features for Spring Selling. Now you can go after the big volume sales which electric men everywhere predict for 1939.

Get the facts about these high-quality big value Hotpoint Ranges. Use them as leaders for your spring sales drive. Be sure to show the complete line of Hotpoint ranges with new 5-Speed Select-A-Heat Calrod, Duo-Speed Broiler and Directional Heat Oven to catch all buyers.

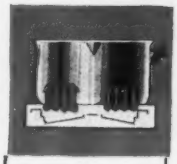
It's Spring—Swing Ahead with Hotpoint's Spring Swing Campaign

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5614 West Taylor Street, Chicago, Illinois



Calrod

COOKING UNIT TARGETS THE HEAT



1

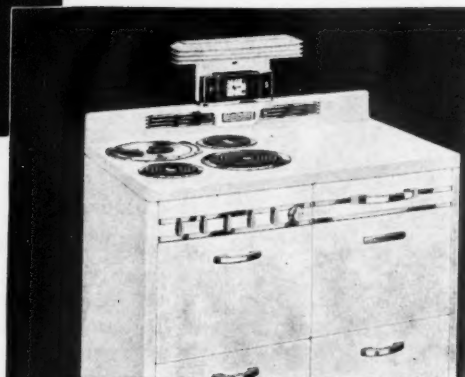
Calrod heat is conducted straight through bottom of pan into food.

2

Calrod heat is efficiently applied—without waste. It is all used for cooking.

3

Calrod heat is accurately controlled. Five different speeds from one switch.



A NEW SALISBURY—Hotpoint's new lower price model of the popular Salisbury. A big value range with 5-Speed Select-A-Heat Calrod units and plenty of Sales Appeal. Looks like the more expensive model, except un... in warmer drawer of this Salisbury operates without the... mostat. Lower cost timer clock and black condiment jar...

Hotpoint

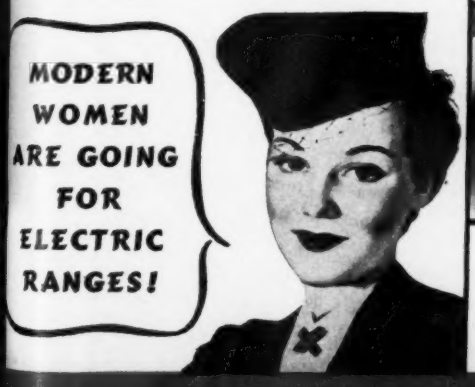
REFRIGERATORS . . . WATER HEATERS

...N HOTPOINT RANGES ...D POPULAR PRICES!

Hotpoint tops the list with big-value merchandise, more sales and advertising help, more features, more cooperation, more assistance.

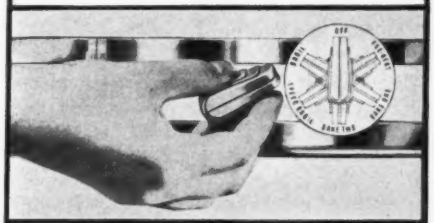
Swing Ahead With Hotpoint!

Hotpoint's streamlined style and abundant sales features win the plaudits of smart buyers. Take the easy road to profitable sales. Lead with Hotpoint, the electric range that is easiest to sell because it is preferred by most buyers.

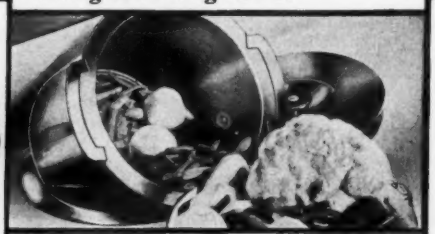


FEATURES

Duo Speed Broiler—Choice of full "Hi-Speed Broil" for charcoal type broiling or lower temperature "Broil" for barbecuing, toasting and broiling well-done meats. Ideal for steaks, chops and fowl.



Directional Heat Oven—Large, oversize automatic oven, with top and bottom heat controlled by one switch. Gives choice of methods, improves baking or roasting results.



Whole-Meal Thrift Cooker—Six quart capacity. Cooks complete dinner without watching. Saves time. Hotpoint cuts cost of cooking.

NATIONAL ADVERTISING

Here's Real Sales Power for You. Hotpoint advertising is timed to tie up with the big Modern Kitchen Bureau "Guess Again" Campaign in the Saturday Evening Post. In addition Ho point advertising will appear in five other natio magazines through your heavy selling seaso

SPRING SWING CAMPAIGN

Swing with Hotpoint's "Spring Swing Campaign" and make this the biggest season in the history of your business. See the new Plan Book with direct-mail material, lively newspaper and outdoor advertising and window and store display material.

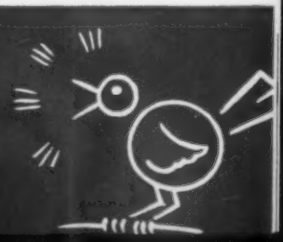
GUESS AGAIN

Modern Kitchen Bureau Campaign

Hotpoint offers material to help bring the big "Guess Again" Campaign into sharp selling focus for you. Tie up with the M. K. B. Spring Drive. Use Hotpoint's Spring Swing Sales Plan. Material can be adapted to your individual needs. Newspaper mats, posters, direct mail, window and store display and all material fo complete spring sales activity are now rea

Electric Ranges

...ISHWASHER-SINKS . . . WASHERS AND IRONERS



Radio Station Promotes the All-Electric Kitchen

By B. C. Creager

EVEN in the heart of the greatest natural gas producing region in America, the electric kitchen is recognized as the ideal of every housewife.

That is the explanation of the management of *KOME*, new Tulsa radio station, for the installation of an all-electric studio kitchen.

From this kitchen the merits of electric cooking and electric service in the kitchen are broadcast to the rich Tulsa trade territory through the medium of a cooking school every Thursday morning and a sponsor's program every week day.

Yet the sales influence exerted in behalf of electric kitchens is not confined to the period of broadcasting. Each cooking school is especially arranged for the benefit of a specific group of women, with groups being brought to the studio not only from the club, social and church life of Tulsa, but from surrounding communities that are within the reach of *KOME*.

This is possible because the kitchen occupies a stage in an auditorium that seats 200 visitors, the only studio of its kind in Oklahoma. The visiting groups see the food prepared, participate in the program by means of interviews on reactions to electric cooking procedure and, in conclusion, as luncheon guests, dispose of the meal. Then the individuals may inspect the equipment without prejudice and make any number of inquiries without fear of getting on a prospect list.

Within the Tulsa area there are a number of electric kitchens available for inspection, but since practically all such kitchens are for sales demonstration purposes, the inference of obligation sets up a certain amount of sales resistance. But at *KOME* no such influence exists and the demonstrator is an unbiased expert intent upon getting the best results from the kitchen, and in so doing, glorifies the equipment without sales effort.

The *KOME* kitchen gives dealer sales an additional impetus by virtue of the fact that all of the various units in use are within reach of the type of housewife who is interested in either listening to the program or attending the school in person.

In charge of the cooking school and daily programs is Jane Austin (radio name of Verle Volk) whose experience includes more than fifteen years with some of the nation's nationally advertised food product manufacturers.

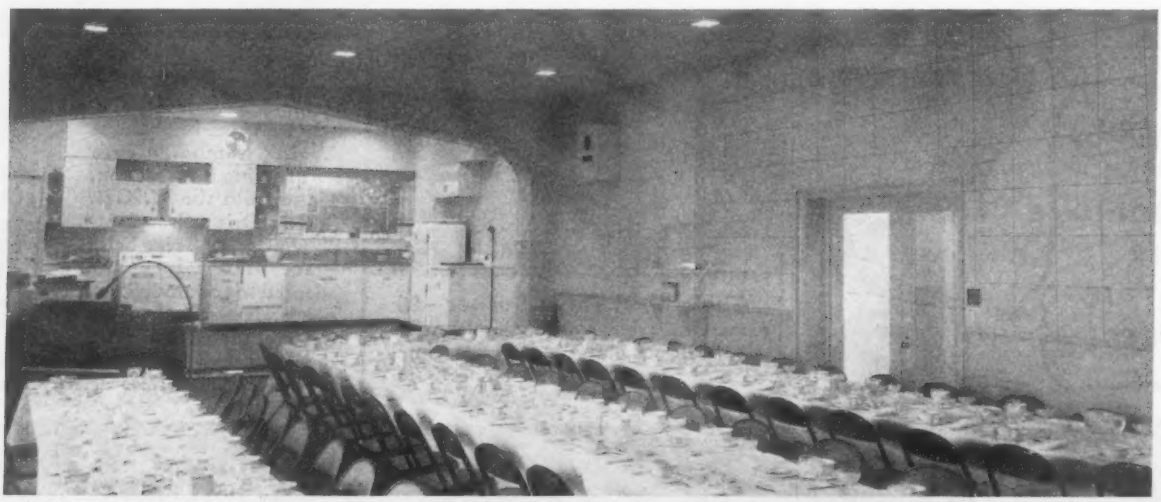
"In selecting the units for the *KOME* electric kitchen," she says, "I particularly insisted on equipment within the reach of the average housewife. I avoided the higher priced units.

"It is obvious to me that the woman who can afford the most expensive electric kitchen will not be keenly interested in our cooking school or our programs.

"Our programs have the most appeal to housewives of moderate means. That being the case, it seems to me ridiculous to think of operating our cooking school of the air with equipment that would be out of reach of the majority.

"Of course, our business primarily is radio, not electric kitchens. But we believe there is an opportunity to put more medium-priced electric units into the kitchens of average homes and we are interested in helping to do that because we believe the electric kitchen is the ideal kitchen. So we proceed to prove it with equipment that almost anyone can buy, arranged just as attractively as if it cost four times as much."

The *KOME* kitchen is equipped with an electric range, refrigerator, water heater, dish washer and roaster. The programs are made possible by eight sponsors, the majority of whom are food manufacturers or processors.



This radio kitchen-auditorium will seat 200 visitors. Programs prove helpful to appliance dealers.

Building Designed for Electrical Sales and Service Business

NEARLY every appliance dealer occupying rented quarters looks forward to the day when he can move into a building of his own, especially designed for his business. The Engle Electric Company, of Lakeland, Florida, attained this objective when it recently moved into an attractive modernistic building —a building designed especially for an electrical appliance sales and service business.

The exterior of the building is of modernistic design. Large plate glass windows hung with Venetian blinds and an attractive entrance featuring a circular window of the new glass brick present a pleasing appearance.

The main display room has a paneled ceiling tinted in white, stippled walls in two tints of pink, and an assortment of counters and tables for the display of small electrical fixtures and merchandise.

At the left of the entrance, Walter E. Engle, owner of the Engle Electric Company, has installed a very attractive private office. Having been brought up in the boat business, and being a director of the Motor Boat Racing Association, Mr. Engle designed his private office to represent a boat cabin. The window corresponds to a port hole in design and all lighting is obtained from marine fixtures. The walls of the office are paneled in walnut finished natural, which is set off with a dado strip six feet above floor. Picture moulding and all hardware is in chromium.

One of the especially interesting features of the new store is the attractive lounge space provided for customers. This is shown in one of the illustrations below.

All floors in the showroom, office and testing room are of brown and orange rubber tile with black border and hospital base.

The floors of the show windows are without railings, and stand 18 inches from the tile floor. They are laid in oak parquetry finished natural, the grain of the wood alternating with each square of the flooring.

Electric lighting for show windows is obtained from recessed fixtures. There are numerous wall brackets for the showing of home lighting fixtures, as well as a number of floor plugs from which power may be obtained to actually operate appliances on display.

At the back of the display room, near the entrance to the shop, is a sound proof room for the testing of radios and phonographs.

Just in back of the showroom is the parts and small supplies department where shelves and bins provide ample space for repair parts and miscellaneous supplies.

A large room is provided in the southeast corner of the building for a service shop. It is well equipped with benches and facilities for appliance repairs and also provides space for the storing of tools and other equipment used in connection with the electrical construction phase of the business. Here, too, larger appliances not actually on the display floor are kept in stock.

Forced ventilation of the most modern type has been provided to keep the building comfortable during the warm weather season.

Mr. Engle started in business in Lakeland eight years ago in a very small way, handling radios exclusively. Since that time his business has grown rapidly and last year he was a member of the Inner Circle of the Quota Buster Club for the fourth year.

Left, W. E. Engle, owner of the company and H. C. McFerrin, formerly with the Florida Public Service Co., sales manager.

Engle Electric Co.'s new home in Lakeland, Fla., has an attractive modernistic front. Left: A comfortable corner that lowers the customer's sales resistance

CONTRACTING SECTION

THEATRE LIGHTING --in Modern Style

MANY lighting innovations were introduced to the movie-going public with the opening of the Lakewood Theatre, recently completed in Dallas, Texas. One of a chain of many playhouses owned and operated by the Interstate Amusement Company, of Dallas, it offers its patrons one colorful vista after another from their first glimpse of the lighted tower until seated inside in the deep-cushioned seats.

To illuminating engineers, electrical contractors, architects and others interested in the design of buildings with great attraction value, this new theatre is an unusual example of the effective blending of modern architecture with planned lighting.

The lighted tower compels attention. Towering over other buildings in the neighborhood, it is visible for a considerable distance. At the very top there is a "twinkling" ball, in which are 504 S-11, ten-watt, clear incandescent bulbs.

The beacon just beneath the ball radiates a soft bluish light from four 400-watt mercury vapor lamps. The tower itself is lighted by 900 feet of green power tubing, placed behind vertical baffles, the fronts of which are lined with 900 feet of red luminous tubing.

The large letters forming "Lakewood" on each side are made up of 2,760 clear S-11, ten-watt bulbs, which repeat a twinkling effect. Exterior walls are illuminated by six 400-watt mercury vapor floodlights—four on the upper tier and two on the lower. One 400-watt mercury vapor lamp glows from the small beacon.

One of the first uses of ultra-violet, or so-called "black light," is to be found in the Lakewood. Statues on each side of the stage, painted with fluorescent paint, glow in their niches, the light sources being invisible to the eye.

The marquee is decorated by 190 feet of power gold and green luminous tubing; and the dual "attraction" boards are lighted by 312 25-watt incandescent bulbs. Beneath the marquee there are 189 exposed 25-watt incandescent bulbs, arranged in rows interspersed by 14 recessed reflectors with 150-watt silver-bowl lamps.

Inside the theatre, lighting serves more than mere illumination—it decorates, and accents the architectural construction, bringing out the beauty of the hand-painted murals in the foyer, of the unusual finish of walls below the murals, and of the numerous other appointments of the theatre.

There are three master circuits that can be controlled from the operating room or stage, to provide any variation of stage or theatre lighting that may be desired

In the foyer, the ceiling is finished with flesh-colored mirrors, which produce a unique perspective above. The mirrored ceiling has a border of light from daylight fluorescent tubes concealed in a light niche having wide reflecting surfaces.

Hand rails which border the wide steps leading to the balcony

foyer are lighted with some 125 feet of standard red Neon tubing, concealed in the under sides. The balcony differs from the main foyer by contrasting light, employing fluorescent tubes in rich shades of blue and pink.

Walls in the foyer are most unusual, being covered with thin sheets of light colored wood with canvass back, pasted on plaster. This gives a "blond" wood effect, quiet yet harmonious and beautiful in appearance. The sheets of wood were cut from the same tree and there is a uniform grain effect.

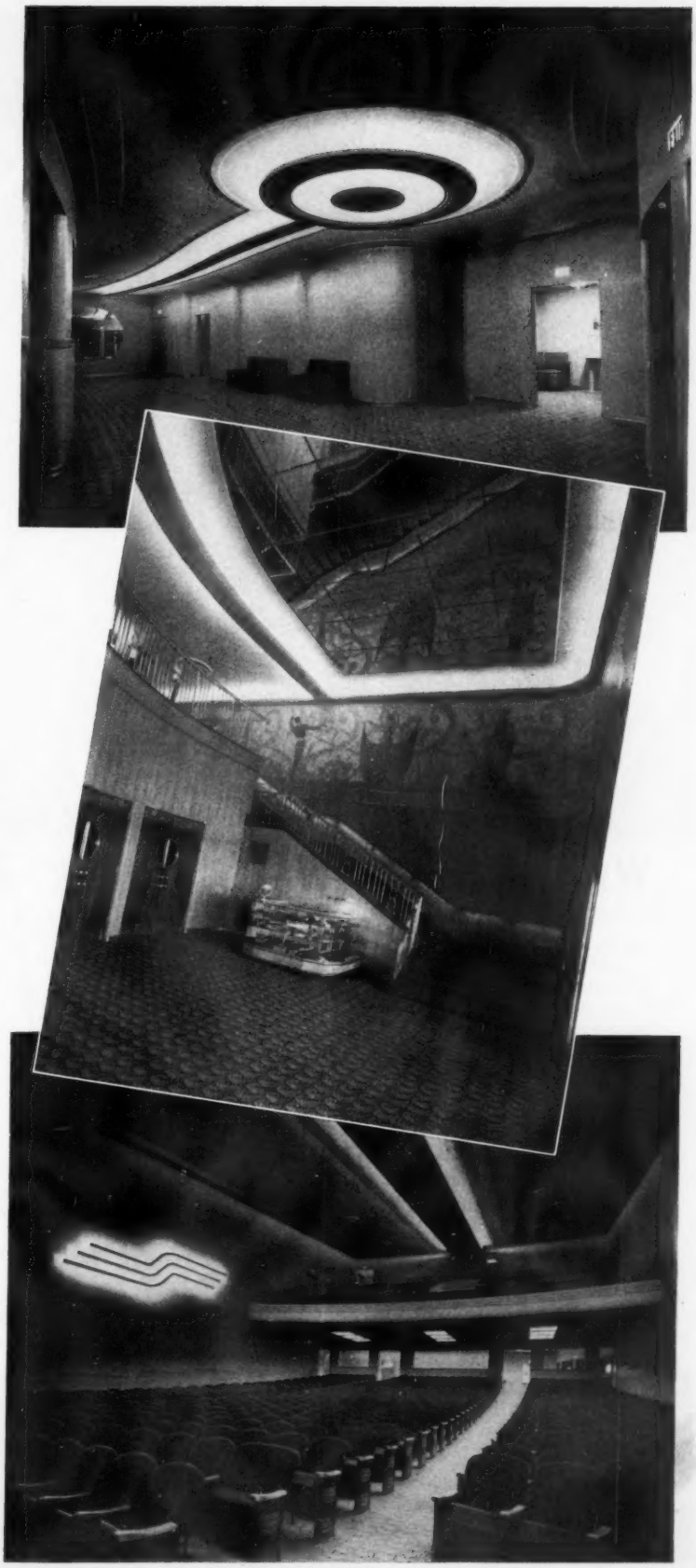
Several doors lead from the foyer into the "standee," just back of the main auditorium. Here one sees a most striking effect from the yellow and red tubing at ceiling, in unusual curved design. There is a most unusual and remarkable blending of colors.

In this lighting design, porcelain enamel reflector troughs containing 65 feet of power yellow and a like amount of red luminous tubing are centered beneath a specially finished reflecting surface. Walls are of buff color. The baseboard is of rolled aluminum.

In the powder room in the ladies' lounge, no lights are visible yet the room is evenly and well illuminated. In one end is a large round mirror, above the make-up table. The mirror is set out from the wall a bit and is framed in light provided by six daylight fluorescent lamps behind it and near the edge. In each corner of the opposite wall there is a 75-watt bulb in a pocket; and there is an indirect lighting fixture at the ceiling.

On side walls of main auditorium there is a most unusual lighting arrangment, shown in the illustration. Lighting is from S-11, ten-watt amber lamps placed just as closely together as possible in special porcelain reflectors. They produce an evenly distributed light, from which there are no spots on the walls, such as may be seen when large lamps are used and placed farther apart. These lamps are controlled by a master dimmer cir-

(*Continued on page* 40)



Considered one of the most modern theatres in the South, the Lakewood of Dallas offers its patrons one colorful vista after another. The unusual lighting greatly enhances the architectural features.

Every house needs
Westinghouse
YOU KEEP YOUR PROFIT!
I HARDLY EVER SEE THESE WESTINGHOUSE WATER HEATERS AGAIN AFTER I PUT THEM IN

WESTINGHOUSE WATER HEATER

Service costs average only 73c per unit... DEALER-PROVED!

Here's an electrical necessity for the home that's mighty easy to sell — ***and attention-free service keeps it sold!*** It's Dealer-proved — exceptionally low service cost means high net profit!

An exclusive combination of four ***Home-proved*** features — gives you a top-notch, quality-product story to tell and provides the carefree, automatic 24-hour hot water service people want.

Make money and keep it — sell Westinghouse Water Heaters. Your Westinghouse Distributor will gladly show you how. Or, write Dept. 9065, Westinghouse Electric & Mfg. Co., Mansfield, O.

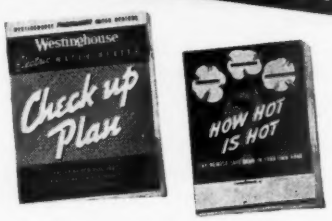
NEW ECONOMATIC CONTROL *Makes Selling Easy*

For prospects who want the utmost in water heating economy. Easily adjusted by the user to secure any water temperature from 120° to 170°. Prospects will like and want this feature.

Westinghouse Water Heaters are manufactured at Mansfield, Ohio, and Emeryville, Calif.

NEW! DIFFERENT! "CHECK-UP" PLAN

Let prospects play the selling game



Interesting new Quiz Game "How Hot is Hot?" entertains prospects while giving them important facts about the many uses for hot water. Sells Westinghouse Hot Water Service. Ties in with the new MKB program. Find out how the plan works. Ask your Distributor for details.

MODERNIZE ELECTRIFY

Westinghouse *Home-proved* Water Heaters

"The Line of Least Resistance"

Every house needs
Westinghouse

The hottest SALES-MAKERS of the year!

New traffic-building, sales-closing team works for Westinghouse Dealers *exclusively!*

Five zones of STEADY cold with TRUE-TEMP Control put Westinghouse Refrigerator dealers a jump ahead of the field right at the starting line. Exclusive sales advantages team up with a new and colorful display, traffic-building, and door-opening plan to give Westinghouse dealers what's needed to sell refrigerators faster and at full profit. Meet the FOOD PROTECTION QUIN-TEMP-LETS and GO TO TOWN!

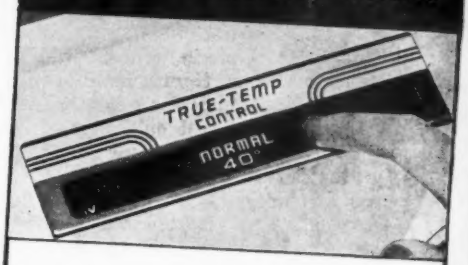
Styled, equipped, priced, and advertised to SELL!

Early sales reports from all over the country point to a Westinghouse year. It's a "hot" line — and a new hot sales plan makes it a winner for dealers everywhere — in smallest towns or largest cities — selling 25 units a year — or 2500. Get the complete story from your Westinghouse representative — or write direct to Westinghouse Electric & Manufacturing Co., Mansfield, Ohio.

IT'S THE *PACEMAKER* FOR '39

BETTER FOOD PROTECTION
•
KITCHEN-PROVED CONVENIENCE
•
LONG, LOW-COST OPERATION

It's STEADY cold that makes humidity SAFE!



Customers are humidity-conscious this year. Westinghouse provides 85% humidity in the big new Meat-Keeper — 90% to 100% in the Humidrawer. What's more, Westinghouse and ONLY Westinghouse, provides TRUE-TEMP Cold Control which assures POSITIVE protection against temperature fluctuations in the food compartment. And it's STEADY cold that guards against mold and bacteria growth in humidified compartments.

ONLY Westinghouse has TRUE-TEMP Cold Control

Westinghouse Refrigerator

"The Line of Least Resistance"

ELECTRICAL INDUSTRY FACES FUTURE LABOR SHORTAGE

UNION authorities and government officials concerned with the future and working conditions of labor might well concern themselves with the approaching shortage of skilled and experienced men in the electrical contracting field is the belief of L. J. Reynolds, prominent El Paso contractor, owner of the Reynolds Electrical & Engineering Company. As an Alderman of the city of El Paso, Mr. Reynolds' opinion is drawn from observation

L. J. Reynolds

and interest in general welfare: as a major figure in the state's electrical contracting field, his conclusion is based on his own company's experiences, and concern for the future of the industry.

A union worker himself until 1925, "Lou" Reynolds is a believer in union wage scales, both as protection for the employee against underpayment, and as protection for the contractor against "floaters" and incompetent employees.

"I don't profess to be an arbiter in wage matters generally," he stated, "and I don't say who is right and who is wrong in capital vs. labor struggles. My attitude is that in my experience the best workers are those who belong to the union, and that by using the best workers I can get the best job done and make the most money, despite the higher wage scale the union commands.

"I was recently asked what effect the newly-enacted wage and hour law has had on the electrical contracting business here," he continued. "The answer is, none at all. We're four years ahead of them here, working our men forty-four hours a week, and paying them a dollar and a quarter an hour. The working man didn't need any legislation to get a fair wage scale out of El Paso contractors."

The labor problem in the electrical industry, according to Mr. Reynolds, grows out of an increasing shortage of competent workers. Each year, he stated, the union ranks are growing thinner, and no younger workers are being trained to replenish them. Men leave the business to go into other lines of work, go into business for themselves, retire, or die, and the lack of an apprentice system is depopulating the field.

"A four-year apprentice system should be in effect," declared Mr. Reynolds, "rather than keeping the unions closed to any but already skilled workers and keeping none but union men on jobs. A boy at least 18 years of age with a minimum of a high school education should be eligible for apprenticeship with the electrical industry, and a satisfactory wage scale for apprentices should be established. By using them, the contractor would not suffer from an increased payroll, as they could do work which would relieve the higher-paid men of less important tasks, and at the same time learn the business. It used to be that they trained one man for every three experienced men, but now there's no one being trained to take the places of men who quit or die off."

(*Continued on Page* 40)

WHAT PROFIT IN GOVERNMENT CONSTRUCTION WORK?

IS there profit in government contracts? "There is," says George Stowers, of Montgomery, Alabama, "*if*: (a) your estimates are figured right down to a hair, (b) you are completely equipped to do the job yourself, and (c) you can keep from getting your money and equipment tied up."

George Stowers

Mr. Stowers, one of Montgomery's busiest and most successful contractors, is one of the few who enjoy getting their teeth into a government job, and is particularly partial to Treasury Department contracts such as post offices.

"The first step in assuring a profit on these jobs is in setting a fair and accurate price on your contract," said Mr. Stowers, "and that means that a really expert estimator must figure your bid. There's no use in bidding a government contract on too narrow a margin just to get the job, but meticulous estimating often indicates places where efficiency can effect savings, and that may make the difference between the successful bid and the losing one. There have been times when contractors could base bids on careless estimates and hope that in a large volume of work, some good jobs would compensate for the loss on some of the others. But that theory won't work out on government jobs."

(*Continued on page* 71)

Rolling Service Shop Provides Many Rewiring Prospects

By Bill Abbott

THE idea of a "service shop on wheels" is not new to the electrical industry but the successful operation of a supplementary service of this kind by the Quinby Electric Company at Tampa indicates that there is a popular demand for such a "front door electrical service."

The outstanding advantage of the Quinby "Traveling Electric Shop" is that it not only operates at a fair profit but, through its thorough canvassing in the residential districts, uncovers many live prospects for electrical appliances and large scale rewiring jobs.

Several years ago Dick Quinby of the Quinby Electric Company at Tampa conceived the idea that when customers did not come to his shop for service the service should be taken to the customers. He got together with Roy Yarick, outfitted a repair shop in a truck, and canvassed the city for small electrical jobs.

The plan was highly successful for awhile. Then it felt the effects of the depression. Householders were passing up electrical jobs with many other things, and the idea was abandoned.

But now, with improving business conditions, it has been placed in operation again on a broader basis. A larger truck is being used with a wider range of shop equipment.

"We were encouraged to try it again by many requests for house-to-house service," Mr. Quinby explained, "but the acceptance has exceeded our expectation. We are serving many former customers and a lot of new ones."

Mr. Quinby pointed out that the plan can be adapted for use in almost any city. He warned, however, that two things are necessary to make it successful.

These are: (1) A competent repairman with ability for salesmanship and for meeting people, and (2) a well equipped, attractive truck.

"If you lack either of these essentials," he said, "you should not waste your time and effort trying to operate a plan like this. Fortunately for me, Mr. Yarick is an ideal repairman-salesman. He knows how to sell service in the homes and he knows electrical work. Get a man like him (if you can) and the battle is half won.

"Then you need a truck that will be a credit to your business. It is your advertisement. So don't put out any makeshift or ramshackle equipment."

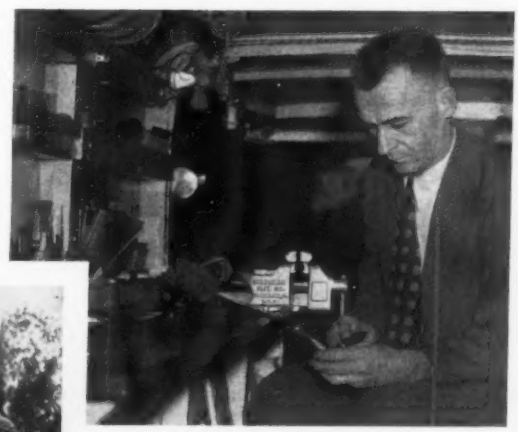
Mr. Quinby's truck is equipped to handle any small job, but no contract is too big. Mr. Yarick specializes in wiring jobs and attic ventilation as well as appliance repairs.

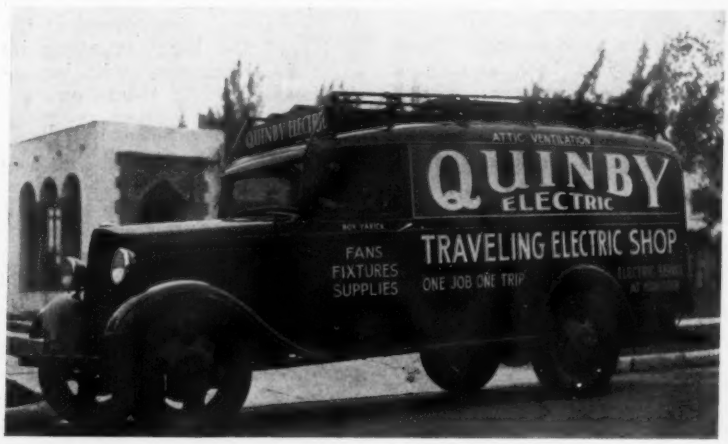
His principal work, however, is to find new business, large or small, and he does it by offering prompt, efficient service.

He goes into residential districts daily, parks his truck and makes a house-to-house canvass for two blocks around. Where he finds no work, he leaves his card with the address and telephone number of the Quinby company. He lists prospects for repeat calls at future dates, and gradually covers the territory.

His solicitations are brief and courteous, and he is surprised himself at the number of broken appliances he finds awaiting their owners' first opportunity to take them to a repair shop. Often the

(*Continued on page* 28)





Roy Yarick, who operates the "traveling electric shop" of Quinby Electric Co., Tampa, not only earns a fair profit but uncovers many live prospects for both appliances and large rewiring jobs.

Notes on Fluorescent Lamps

Popularity of these new lamps is increasing rapidly. Their installation presents many new problems to the electrical contractor.

(1) What changes or improvements have been made in the auxiliaries?

The new magnetic switch type auxiliary has been reduced in size so that it will go inside of wiring channels which formerly would not accommodate this type. The outstanding features are low watts loss, low operating temperature, quiet operation, positive and fast starting and restarting and better lamp operation over a normal range of voltage change. In short, it is the highest quality auxiliary available and should be recommended as such.

The new thermal switch type auxiliary has also been reduced somewhat in size. It has a higher wattage loss, is apt to be somewhat more noisy than the magnetic type and has a slower restarting time. They will prove entirely satisfactory however where the slower restarting time and slight hum is not objectionable. Incidentally, the new auxiliary has decidedly less hum than the original design, and the switch has also been improved to give better restarting.

(2) Do auxiliaries give objectionable hum?

The following is quoted from Electrical Testing Laboratories' report of December 16, 1938: "Recent tests indicate that there is some hum present in each of the auxiliaries that has been tested, though in no case was there sufficient noise to measure by any available noise meter. With the unit mounted on a wooden table, it was necessary to place the ear near the unit to detect any perceptible hum. Some manufacturers have suggested that they have experienced an objectional hum from fabricated fixtures. In this case it is probable that the sound may be resonated by the fixture walls and its audibility greatly increased. In such cases, relief should be secured by the use of fibre or felt washers between the auxiliary and the lamp frame."

(3) Do fluorescent lamp installations cause radio interference?

Although all auxiliaries are now provided with condensers to reduce radio interference, we do not expect that they will entirely eliminate it. This is due to the fact that the lamp itself is in effect a miniature broadcasting station. Having the lamps and radio on separate circuits will also tend to reduce any interference.

The following is quoted from a bulletin issued by the Electrical Testing Laboratories, dated December 16, 1938: "Tests were made at Electrical Testing Laboratories of the radio interference noise produced in starting and operating lamps equipped with thermal and vibrator type of auxiliaries.

Outside of a click similar to that which is experienced from the operation of a switch in the circuit, the thermal type is practically free from noise. With the early magnetic type, however, noise like a machine gun or riveting machine begins at the time the switch is closed and persists until the lamp lights, because the early magnetic types were not equipped with condensers. The new magnetic types which have just been announced by the manufacturers are equipped with condensers and are said to be free from this difficulty."

This would seem to indicate that we need not be unduly alarmed over the question of radio interference.

(4) What is the power factor of fluorescent lamps?

Power factor of lamps and auxiliary is in the neighborhood of 55 to 60%. In small installations, this will not prove objectionable. In larger installations this may be corrected by capacitor-transformers which are now available. Consideration is also being given to individual condensers included in the auxiliary, however bulk and cost are two objections to be overcome. It is possible a condenser may be designed to take care of several lamps and yet be small enough to be included in wiring channels with the other auxiliaries.

(5) Can fluorescent lighting be measured with the general electric light meter?

Laboratory tests showed that ten meters calibrated for tungsten light had an average multiplying factor of 1.007 or practically 1. However, it was found that certain individual meters were off, apparently the difference being in the cell. For field use a multiplying factor of .9 is suggested.

(6) What is the brightness of fluorescent lamps?

The following brightness figures were made on *new* daylight fluorescent lamps and calculated for the other colors. It should be borne in mind that these are maximum figures made on *new* lamps. Since all published figures on lumen output are taken from lamps which have burned 100 hours, these figures are somewhat higher than will be found from lamps in use. At 75 degrees from normal at the center of the lamp or along its axis, the brightness will be approximately 1/2 of the following:

Candles per Square Inch

Color	15 Watt	20 Watt	30 Watt
White	4.5	3.0	4.9
Daylight	4.5	3.0	4.9
Blue	2.7	1.8	2.9
Green	9.0	6.1	9.7
Pink	3.0	2.1	3.3
Gold	2.7	1.9	2.9
Red	0.5	0.3	0.4

(7) Can fluorescent lamps be operated on d-c circuits?

Yes, but in addition to the usual auxiliary it is necessary to provide

an extra resistance to "use up the voltage" normally dissipated in the auxiliary through impedance. This results in the wattage loss in the auxiliary and resistance being practically equal to the lamp wattage. Such a condition, of course, results in a low overall efficiency in lumens per watt.

(8) What is the comparison in radiant heat from fluorescent lamps as compared to tungsten lamps?

Radiant heat per footcandle from the daylight fluorescent lamp is very comparable to that from natural daylight. Following is the data for the various sources.

Source	Relative radiant energy per footcandle
15-watt daylight fluorescent	1.0
30-watt lumiline	10.3
40-watt A-19 I. F. tungsten	5.2
100-watt A-23 I. F. tungsten	4.5
200-watt PS-30 I. F. tungsten	4.0
500-watt PS-40 I. F. tungsten	3.5
15-watt daylight fluorescent with 1/8" ordinary glass interposed	0.33
Daylight through window glass	0.35
Daylight without glass	0.45

This is an important factor both in showcase lighting, and in locations where we want 50 to 100 footcandle intensities.

(9) Change in color of daylight lamp.

The early daylight lamps gave almost a true daylight spectrum with the exception of a slight deficiency in the red end of the spectrum. All lamps manufactured since November 14th have employed a new color mix which will give somewhat more red radiation than in the past. This should further improve an already excellent light source for color discrimination work.

(10) What affects the life of lamps?

In general, fluorescent lamps lose their usefulness because of decrease in light output before they fail to operate. Darkening of the bulb occurs because of the effect of mercury on the fluorescent coating and because of the material given off by the electrodes. The latter especially causes darkening at the ends of the bulb late in life. The rate of depreciation in light output diminishes throughout life; the first hundred hours produce about as much darkening as the following 1000 hours. Rated output is based on conditions the first 100 hours.

Frequent starting of lamps may take more life out of the electrodes than long hours of burning because momentarily there is a higher normal voltage drop at the electrodes which sputters or evaporates off the active material. If a lamp is started once a minute, for example, the hours of burning will be shorter than normal, but if it is turned on and burned continuously its life will be longer than normal. When the active material on the electrodes is used up, the voltage required for starting and operating becomes high and a lamp is then said to have failed.

(11) How does the variation of the supply voltage affect the operation of the fluorescent lamps?

With fluorescent lamps, voltage regulation depends on the choke used and not on the starting mechanism. With a small, low priced choke (such as is used in the thermal auxiliary) a 2 to 3% variation in lumens will result from a 1% change in volts. But the use of a higher quality choke (one with more iron as used in the magnetic auxiliary) will reduce the variation in light output to 1% or slightly more with a 1% change in voltage.

As the line voltage goes up the lamp voltage goes down, and although the lumen output increases the efficiency actually decreases. The reason for this is that the increased line voltage causes the choke to pass more current to the lamp which lowers the resistance of the discharge path and results in a lower voltage drop across the lamp itself. The watts input to the lamp are slightly increased, and therefore, the lumens increase although not as fast as the watts. Under these conditions, the higher current density produces the short wave ultraviolet radiation less efficiently; consequently, the luminous efficiency of the lamp decreases.

(12) What is the rate of depreciation of fluorescent lamps?

During about the first 100 hours operation, the light output from fluorescent lamps drops rapidly; the decrease varies with different colors and may be as much as 3 to 5 lumens per watt. For this reason the rated light output values are based on readings taken after this initial loss has occurred. After 100 hours the depreciation is quite gradual so that even at 1500 hours the light output is still better than 70% of the rated value. Since the output from new lamps is considerably greater than published values, footcandle readings taken shortly after making complete installations of new lamps may be much higher than the illumination level designed for.

(13) Lamp life.

The lamp is designed to give its best, all-around performance within the specified voltage range. Lowering the voltage will not necessarily increase the life of the lamp as is the case with filament lamps,

(*Continued on page* 40)

S. G. Hibben of Westinghouse Lamp Division is holding one of the new 48-inch lamps which has an output of 1400 lumens. The lamps will be available in daylight and white.

LEGISLATION, ADEQUATE WIRING -- FEATURES OF CONTRACTORS' CONVENTION

FEW trade associations can boast of having standing room only available at their conventions but such were the conditions that prevailed at many of the sessions of the annual convention of the Florida Association of Electrical Contractors and Dealers held in Orlando, March 13 to 15. One of the well-attended sessions of the association is shown in the photograph above where many found seats in windows, and others stood in the rear of the meeting hall.

The Florida association, a state wide organization, is rapidly gaining recognition nationally as one of the most active and energetic of such groups. One of the principal reasons for the unusual interest manifested in the meetings of the association is its policy of avoiding "long winded" theoretical speakers and presenting in their place short talks by well known speakers who attack current problems of the industry from a realistic viewpoint. The National Adequate Wiring program and a proposed electrical license and inspection law for the state of Florida were the principal subjects for discussion at this meeting.

President O. V. Scott, of Miami, opened the first session Monday morning and called upon Dean Melville Johnson for an invocation.

D. M. Clayton, of Birmingham, southeastern district committeeman for the National Electrical Contractors Association, spoke informally on the advantages of membership in the national association. As an example of the need for concerted action on the part of electrical contractors, Mr. Clayton directed attention to the bill recently introduced in the Senate which will require general contractors on public building projects to name in their bids their subcontractors, material men and supply men whose services the bidder intends to utilize in the performance of the work. He pointed out that this bill is similar in general purposes to "H.R. 146" passed by Congress at its last session but vetoed by the president. The new draft of this bill covers only the fundamental purpose intended and all of the objectional features of the former bill have been eliminated. Only through the organized support of electrical contractors, said Mr. Clayton, can solutions to these major problems of the industry be found.

As another example of the advantage of membership in the national association, Mr. Clayton cited the splendid work that is being accomplished under the voluntary agreement plan of fair competition. Reviewing the features of this plan, Mr. Clayton pointed out that it is a contract signed by the contractor who desires to operate at a profit, while rendering that service to his community, which alone justifies his existence. He agrees to operate according to economically sound principles which will allow him to become a successful business man; to render the proper service to his customers, a service they have a right to expect; and to compete with other contractors on a basis that enables them to operate as he does.

F. J. McGinnis, secretary of the association, followed Mr. Clayton on the program, reporting on the activities of the association for the past year. He emphasized particularly the work of the members of the legislative committee who have drafted a proposed electrical license and inspection law for the state of Florida that appeared to be satisfactory in every respect and had been termed one of the most effective laws of this nature yet proposed. The bill is to be presented at the next session of the

state legislature.

Although Earl Peak, president of NECA, was scheduled to address the meeting on its opening day, an illness prevented him from attending. Pinch-hitting in his place, however, Laurence W. Davis, general manager of NECA, addressed the group.

Mr. Davis expressed considerable concern over the fact that administrative or bureaucratic rulings are becoming a serious problem of industry today. Our only defense in these matters, he said, is to let our representatives in Congress know how we feel about these rulings. He gave as examples certain rules of the procurement division of the Treasury Department which carried as penalties for failure to comply the seizure of tools, equipment, etc., without recourse.

There is a need for us to realize, Mr. Davis said, that our business is vitally affected by the trends toward substituting administrative or bureaucratic rulings for legislative authority.

New Fields of Opportunity

Mr. Davis also spoke upon the need for enlargement of the field of opportunity in the electrical business. This, he said, is the industry's real need rather than solving the problem of severe competition. He pointed out that the enlargement of the field of opportunity was being accomplished as a result of such programs as the adequate wiring, better light—better sight, and modern kitchen promotions. Two more bureaus are being set up, he explained, one for the purpose of promoting wiring adequacy in commercial establishments, business buildings, hotels, etc., and another for the study of industrial electrical applications which should open a new field for industrial electrical contractors.

The Monday afternoon session was devoted to a closed meeting for contractor members. A similar meeting for Florida jobbers present was scheduled for Tuesday afternoon.

General Electric's "Exposition of Light" was featured in a short meeting Monday evening. This presentation drew a large attendance.

The Tuesday morning session was opened with a number of short talks by representatives of Florida utility companies. Of particular interest, was the talk and sound film presented by Larry Hoffman, safety director of the Florida Power & Light Company. Mr. Hoffman's remarks were most impressive and emphasized the theme that safety promotion is definitely a sound business practice.

Another interesting feature of the Tuesday morning session was the Florida Power & Light Company's presentation of the Adequate Wiring Program. This part of the program had been presented just a week or two before in more than a dozen cities served by the Florida Power & Light Company.

R. D. Hill acted as master of ceremonies and called first for a showing of the film entitled "Power for Living." F. J. McGinnis then presented the National Adequate Wiring Program in considerable detail. He was followed on the program by A. C. Berg, lighting specialist, Florida Power & Light Company, who discussed the new "Handbook of Interior Wiring Design." Many copies of this manual were passed out to members.

Adequate Wiring Demonstrated

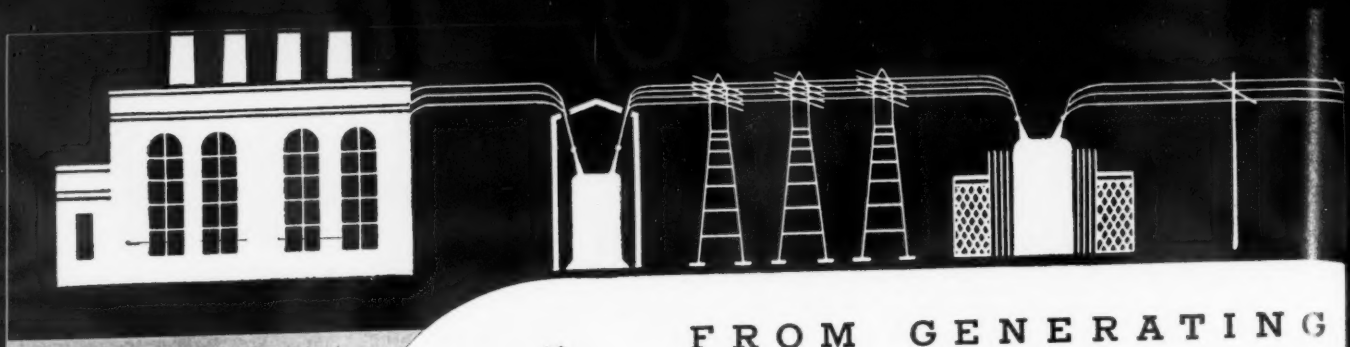
A practical demonstration by W. H. Davidson, also of Florida Power & Light Company, stressed the penalties of inadequate wiring and concluded the adequate wiring phase of the program. Mr. Davidson took up successively the subjects of lighting, heating and power and showed how a customer fails to realize the full value of his electrical service when inadequate wiring results in subnormal voltage at the outlet.

One of the highlights of the entire convention was the instructive talk presented by C. M. Ripley, General Electric Company, entitled "It Costs Less to Live Better." Mr. Ripley has the knack of dramatizing even the dullest statistical facts in a most interesting and entertaining fashion.

Because of the importance of the proposed state electrical license and inspection law, the entire Tuesday afternoon session was devoted to a discussion of its features.

A banquet and dance at the Flamingo Club was the concluding feature of the convention.

Officers and guest speakers of the Florida Association of Electrical Contractors and Dealers gathered for this picture. Reading from left to right, they are: J. H. Schumaker, Winnipeg, Manitoba; C. M. Ripley, General Electric Co., Schenectady; R. C. Bigby, treasurer, Tampa; F. J. McGinnis, secretary, Palm Beach; D. M. Clayton, southeastern district committeeman of NECA and president of the Southeastern Industrial Chapter; Fred Stewart, southern district committeeman, Miami; Lawrence W. Davis, general manager, NECA, New York; S. W. Shaw, western district committeeman, Tampa; O. V. Scott, president, Miami; W. F. Jefferis, central district committeeman, Orlando; Walter Monroe, vice president, Tampa; W. O. Henderson, northern district committeeman, Jacksonville; A. T. Wilson, eastern district committeeman, Ft. Pierce; S. C. Reddick, chairman legislative committee, Jacksonville; W. H. Davidson and A. C. Berg, both of Florida Power and Light Co. Miami.



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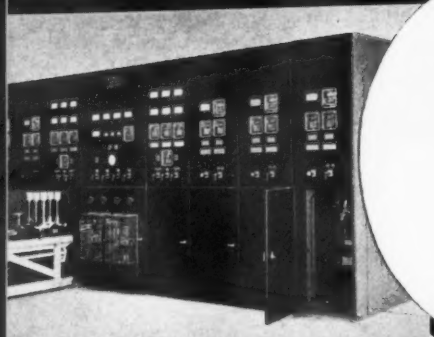

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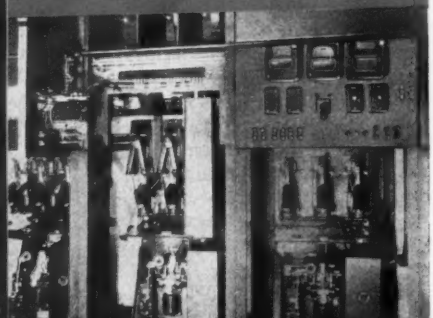
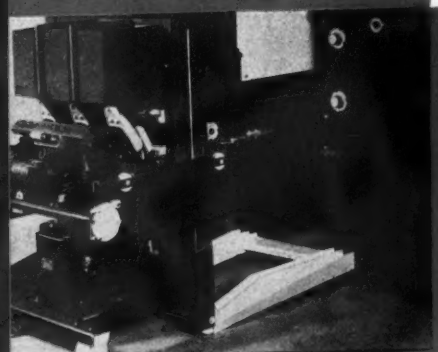


TYPE U "DE-ION" AIR BREAKERS . . . Up to 15 Kv. Oilless, high-speed arc control, simplified inspection and maintenance; universal mounting.



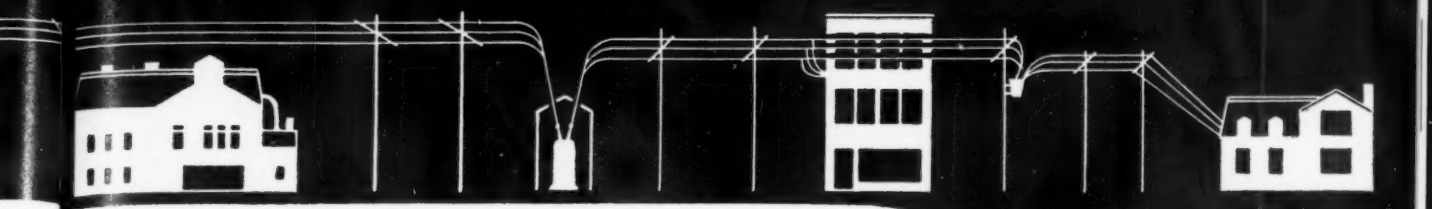
NEW TYPE DA "DE-ION" AIR BREAKERS . . . Give circuits of 600 volts and below a better break by reducing arcing time and burning of contacts. Fixed or removable mounting.

Westinghouse "miniature system" tests take guesswork out of system planning

In originating the A. C. Network Calculator, Westinghouse has enabled scores of utilities to know in advance the actual effect of projected changes in their systems. During the past 9 years, over 200 systems or portions of systems have been set up in miniature on the Network Calculator for study. Probably the most important single contribution to the central station industry, this development makes possible accurately coordinated and related system protection. Full information on how the A. C. Network Calculator may be made available for study of your problems will gladly be forwarded on request.

W WESTINGHOUSE ELECTRIC

Westinghouse



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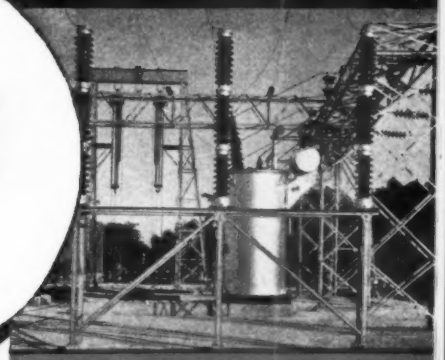
PROTECTION

FOR THE WHOLE JOB...

...*better protection for any part!*



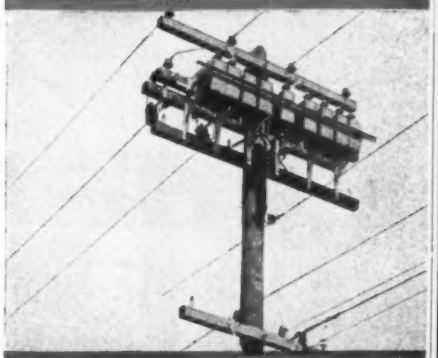
TYPE SV STATION ARRESTERS . . . Low protective ratio and high surge capacity. Assure maximum protection to connected equipment and protective device.

Correct protection . . . for generator, for substation, for any system part . . . is not a piecemeal problem. System stability goes up . . . costs per kw-hr. go down . . . when protective equipment is correctly related, in design and action, both to other protective apparatus on the line and to over-all system operation.

With the broadest background of over-all system engineering experience in the industry, Westinghouse is able to supply the *correct* protective equipment for an entire system, or any part of it, with completely co-ordinated and predetermined results.

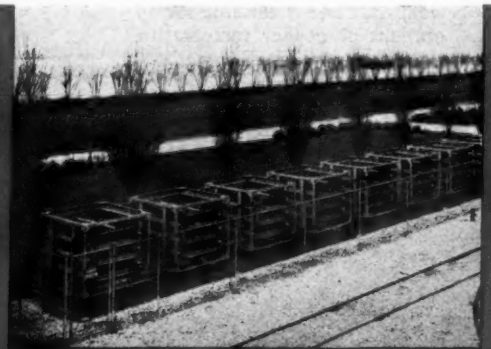
Whether you have a problem of improving system stability, increasing capacity, or replacement of present equipment, you will find it profitable to investigate newest developments in Westinghouse *related protection.* Make sure — *be sure* — check Westinghouse before you buy! Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7N.

J-60290

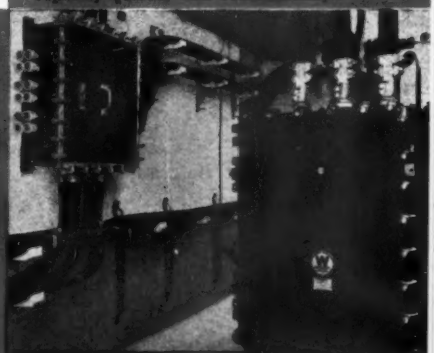


CAPACITORS . . . Protect your income by mounting capacitors on poles near load centers. Improve both power factor and line voltage . . . add "pay load" capacity quickly and economically.

CONTROL DESKS . . . Centralized control and space saving, sectionalized desks, integral hinged rear instrument and relay panels; circular desks available for even more convenience and compactness.



NEW STAINLESS STEEL RESISTORS . . . For neutral grounding. Absolutely weather-proof. Will not deteriorate. Non-inductive — withstand longtime duty cycles. Light, strong, unaffected by temperature changes.



NETWORK PROTECTORS . . . Standard Westinghouse designs have kept pace with latest developments in modern network system practices.

e Protective Equipment

RUBBER COVERED POWER CABLES • BUILDING WIRE
VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD-ENCASED AND PARKWAY CABLES • ARMORED CABLE
CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

CRESCENT
ENDURITE

PERFORMS

ENDURITE Insulated Wires and Cables
Combine the Maximum in PERFORMANCE and ENDURANCE

PERFORMS:
They lower the cost of installation because of the ease with which they can be handled and pulled in; because the insulation is free stripping and leaves the copper conductor bright and clean to facilitate rapid connections; because of CRESCENT quality and superior service.

ENDURES:
ENDURITE Insulation is especially resistant to deterioration from heat and is suitable for operations at copper temperatures up to 75° C, permitting high current loads and installations in hot locations. Its super-aging qualities assure maximum life and make it the wire to use for the toughest locations and important jobs.

ADEQUATE WIRING SERVES AND SAVES

CRESCENT
INSULATED WIRE & CABLE CO. INC
TRENTON, NEW JERSEY

SOUTHERN REPRESENTATIVES

ATLANTA, GA.
Edgar E. Dawes
A-4 Rhodes Bldg. Annex

NEW ORLEANS, LA.
Paul Hogan, Jr.
823 Perdido St.

CRESCENT ENDURITE SUPER-AGING INSULATION

Rolling Service Shop Brings in Prospects

(*Continued from page* 21)

appliances have been discarded to trash heaps in attics and garages.

He finds outlet and wiring jobs that never would materialize if the prospective customer had to get in touch with an electrical contractor. Many calls give him tips on new home construction and open the way to sales of refrigerators and other appliances.

"The small electrical job that is not absolutely necessary," Mr. Yarick said, "will go undone oftentimes because the householder is not interested enough to call a contractor, get an estimate and have the job done. It's just too much trouble for the average person.

"I can give a price and do the job without the slightest inconvenience to the householder. People seem to appreciate this immediate service, and they will look around to find something for me when I call."

The Quinby truck emphasizes "one job, one trip," obviating the necessity for a call to make the estimate and another one for the work. It also advertises "electric service at your door."

Truck Arrangement

The truck is equipped with a fully outfitted work bench with a pipe vise and all other tools necessary for small repairs. It has a compressed air tank for motor cleaning that he fills with gas station tire pumps.

One side of the truck is lined with shelving and six-inch bins with partitions of twenty-gauge sheet metal. The shelving is slotted and the partitions are removable to make bins of any size that might be needed.

The bins carry a full stock of materials for repairs, and each bin has a label and price. The material is arranged in alphabetical order to facilitate inventories. Ladders are carried on top.

"My biggest selling point," Mr. Yarick said, "is the fact that no job is too small. I can handle the small jobs because I do not have the overhead cost of a special trip to get it. I cover about eight blocks, or two blocks in each direction from the point where I park the truck. and see more than fifty customers on a single trip."

APPLIANCE Service

CORRECT VALVE OPERATION IS ESSENTIAL FOR EFFICIENCY

By Allen Parker

REFRIGERATION machines naturally lose efficiency after several years of operation because of normal wear of the cylinder walls, pistons, rings and valves. Among the calls that are marked "no refrigeration" and "slow refrigeration" the trouble may be attributed to faulty valves in many instances. Which is to say that whether it is a short job of increasing the machine efficiency or rebuilding the machine, valves will always play a very important part.

The device used for metering of refrigerant to the system, that is high or low side float, expansion valve or capillary tube is the very pulse of the system and a slight miscalibration or lack of adjustment will immediately show up in poor performance if not complete absence of refrigeration.

The older type refrigerator using a constant pressure expansion valve was a headache for almost every service engineer. This type of valve required a very definite setting on any particular refrigerator. A setting above the correct setting would increase the pumping capacity of the compressor, but the temperature of the gas would not get low enough for the thermostat to cut off. And if the setting was too low, the temperature of the gas would go down, but the pumping capacity of the compressor at that pressure would not be sufficient to do the job and consequently the compressor would never shut off.

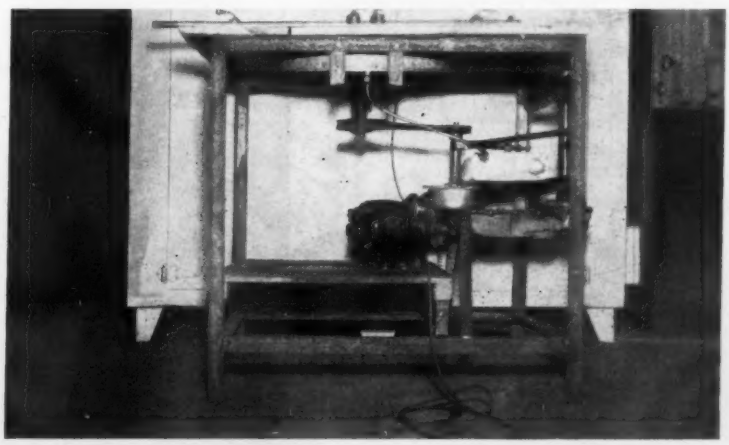
Since there are very few service engineers who can remember off hand the correct low pressure setting on many different model refrigerators the result is that many repeat calls are made before the correct setting is attained. In such cases, I prefer to sell the customer on the advisability of installing a thermostatic expansion valve which meters the refrigerant correctly for maximum efficiency and pumping capacity of the compressor at any temperature of the evaporator or cooling coil.

Of course, even these give trouble sometimes. When the valve begins to frost completely over the body, including the refrigerant inlet, it is necessary to remove the valve strainer for a good cleaning. Should the valve appear to be dead and allow no refrigerant to pass, there is a possibility of the strainer being plugged. However, heating the power bulb will indicate whether it has lost its charge. As a last resort, the heating of the valve itself will put it to working should there be moisture frozen in the orifice of the valve.

To prevent a repetition of moisture freezing in the valve there is a liquid now available through one of the leading manufacturers of sulphur dioxide of which a small amount injected ahead of the valve will do the trick. Don't make the mistake of putting ordinary antifreeze that might be on hand into the system, for eventually it is sure to give trouble. Even alcohol has mild chemical reaction in methyl or freon and soon forms a sticky jelly.

Low side floats were very popular with most refrigerator manufacturers several years ago and they are still considered a dependable low side dividing point. Sometimes trouble will be experienced from a plugged strainer or orifice. Slow refrigeration will most frequently be caused by an inaccurate calibration of the float which may be the result of a sharp jar. An inaccurate low side float valve if out of calibration on the low side will cause too much oil to accumulate in the evaporator and form what is commonly known as an oil blanket, which retards or may completely stop the evaporation of the refrigerant. If the calibration is out on the top side the refrigerant level will rise too high and a return of liquid to the compressor will cause a frosted suction line.

A leaking float ball will cause it to stop functioning entirely by hanging open. One definite advantage of the low side float is that it does not require a critical charge of gas for good performance. High side floats have been adopted recently by a good many manufacturers, possibly because



The tedious job of lapping valve plates by hand was eliminated by this machine built from odds and ends in the shop.

they operate on a much smaller quantity of gas, which complies favorably with new laws adopted in some states. However, the smaller quantity of gas makes it necesary that the gas charge be accurate within a few ounces if good performance is to be obtained. Insufficient gas will produce poor or no refrigeration, while too much gas will cause a frosted suction line (note that this symptom is the reverse of that applying to the low side float).

Air-Bound Float Chambers

A frequent cause of trouble is for the float to become air bound or have non-condensable gas to accumulate in the float chamber making it inoperative because gas or liquid will not flow into it. The remedy of course would be to purge the non-condensable gas off the top of the valve.

A machine that pumps too much oil by the pistons will accumulate, over a period of time, enough oil in the condenser and float and take up so much space in the condenser, that there will not be enough heat transfer area in the condenser. As a result, the condensing unit will be inefficient because of high head pressure. This is one disadvantage of the high side float. To relieve such a condition, it is necessary to bleed off the excess oil.

The valves we have just discussed are used as the dividing point on the low side of the refrigerator system. Naturally the high side must have a dividing point which is the discharge valves. Here, again, the efficiency of the whole system can be gained or lost through improperly seating discharge valves as well as the compressor suction valves.

With leaking suction valves the compressor gains very little if any work at all, while with leaking discharge valves, a large proportion of the work accomplished is lost. Leaking discharge valves can be easily detected by installing high and low pressure gauges and closing off the hand suction service valve, pumping a vacuum, then stopping the compressor. The back pressure will immediately build up on the low pressure gauge if the valves are leaking. Leaking suction valves can be determined by slowly closing off the discharge hand service valve while the machine is in operation. The extent to which they are leaking will be determined by how much pressure the compressor will pump.

With the suction valves seating poorly, the hand valve can be closed all the way in without excessive head pressure. On twin cylinder jobs a sharp fluctuation will be noted on the gauge when the hand valve is being closed if only one valve is leaking. Whether to completely close the hand valve in this test will be determined by the efficiency of the compressor as noted on the high pressure gauge.

Needless to say, the remedy for leaking compressor valves would be to replace and reseat the valves, The cost of new valves amounts to very little but the job of giving each valve plate seat a new mirror like finish requires plenty of labor. Many jobs have been a headache because the service engineer tried to speed up the lapping of the valve plate by using coarse abrasives. Failure resulted because the abrasives scratched the surface of the valve plate, while some of it was embedded in the surface never to be removed and the necessary mirror like surface was never achieved.

Not only is the job of lapping in a valve plate by hand a tedious one, but if very many are to be lapped in it can amount to a large labor item. We experienced this and decided to construct a machine for this purpose. We wanted to duplicate as nearly as possible the hand motion because to lap a plate in a direct lateral motion or spin would mean greater wear on the outer edge of the surface than the inner edge. We drew up a plan that we thought would accomplish these motions with a minimum of exposed moving parts and decided to use the mechanism from an old washing machine. This mechanism was mounted in a steel angle iron frame which was ultimately to become the cabinet.

A large iron disc 18 inches in diameter was mounted on an automobile front wheel spindle, the wheel hub with the bearings was welded in position on the frame. The disc was welded to the spindle off center so that it would oscillate as it went around. Also the disc will operate at about a 20 degree angle so the liquid lapping solution will continually flow down the front taking with it any abrasive. The disc was then connected to the agitator shaft thru two V pulleys and belt.

Operating Valve Grinder

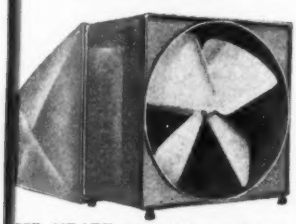
In operation, the disc will oscillate first in one direction a few turns then reverse itself. This gave us two oscillating motions and since the belt slips a small amount each time it reverses itself, the disc gradually travels a complete turn about every twenty minutes in a counter-clockwise direction. We needed something to hold the valve plates against the moving disc so we mounted a one-inch shaft in self aligning bearings across the disc and to the shaft fastened two arms with set screws so that they might be adjustable to width. Each of these arms had four adjustable fingers under spring tension.

With this universal holder several valve plates can be lapped at one time. Also, it is adjustable to any type valve plate. That we might get two more different motions on the valve plates being lapped, an eccentric from an old

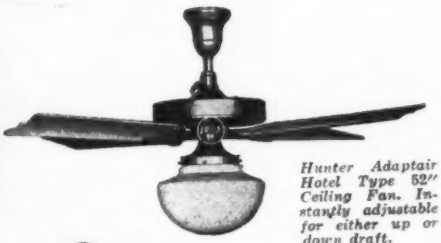
(*Continued on page* 39)

The completed valve plate lapping machine in operation.

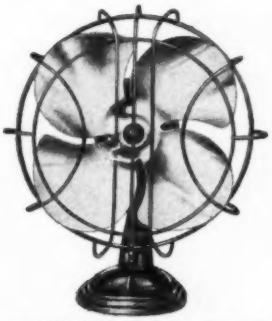
AIR COOLING EQUIPMENT



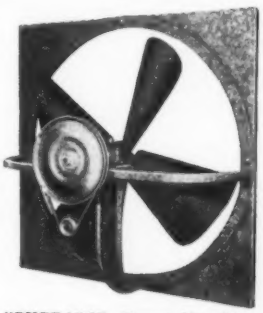
REX AIRATE new attic ventilators. Complete, ready to install, with automatic ceiling shutters. Quiet and economical in operation.



Hunter Adaptair Hotel Type 52" Ceiling Fan. Instantly adjustable for either up or down draft.



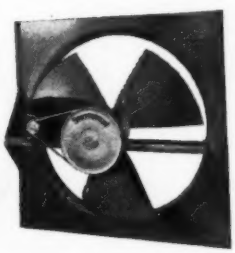
ARCTIC-AIRE DeLuxe fans at popular prices. A complete line, 8 inch to 28 inch. Unexcelled performance plus modern design.



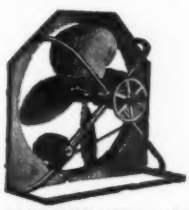
"BUFFALO" Breeze-Air Attic Fan for home comfort cooling. Large capacity—unusually quiet economical operation.

Victor No-Draft Fan featuring the sensational new "Miracle Breeze" Ribbon that proves amazing no-draft performance.

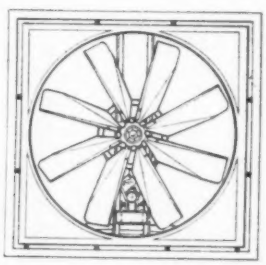
SIGNAL'S new Deluxe 16" Streamliner heads its 1939 line of Desk Type Fans available in a range of sizes from 8" to 16" in both AC Induction and Universal models.



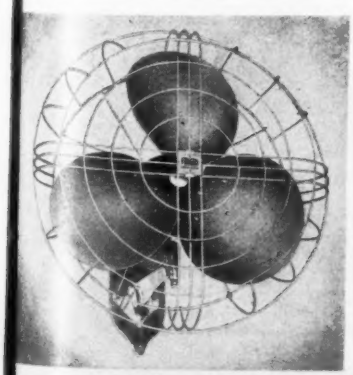
STURTEVANT Atticvane Fan. Sizes from 24" to 48". Capacities from 2880 to 20,000 c.f.m. No radio interference, quiet operation, adjustable sheaves.



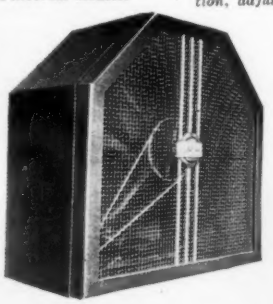
MODERNAIRE, the new attic fan by Dallas Engineering Co., has all steel welded frame. Many new features. 36 Inch fan rates 10,000 c.f.m. — Other sizes proportionately high.



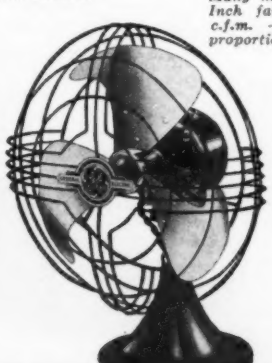
The improved COOLAIR home cooling fan in its exclusive spring mounting. Re-designed and more attractively priced.



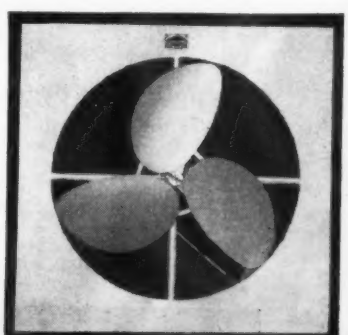
FRIGID Air Circulators by Circulators & Devices Mfg. Corp. Large air delivery at low cost. For use in theatres, restaurants, stores, churches, etc.



"Ventura" Home Conditioner—The attic fan designed and styled for the modern home. Compact, self contained acoustically treated steel cabinet. Quiet. Low Operating Cost. Made by American Blower Corp.



GENERAL ELECTRIC large Super-Quiet Fan that provides large volume of air movement with amazingly quiet operation.



COOLVENT System of Cooling and Ventilating. Capacities 3800 to 18,200 CFM with exceptionally quiet operation.

ArcticAire--The 100%

2 SPEED CIRCULATORS
(non-oscillating)

22″—AC— List $ 75.00
22″—DC— List $ 90.00
28″—AC— List $ 89.50
28″—DC— List $104.50

An ArcticAire automatic "built-in" model makes a permanent lifetime installation. Telescoping boxes fit walls 6 to 23 inches thick.

KITCHEN VENTILATOR
(Wall Type)

10″—1 speed— List $22.50
12″—1 speed— List $31.95

PEDESTALS
10″ Rubber Ped.—Osc.—2 speed—List $14.95
10″ Osc.—1 speed—List $13.95
12″ Osc.—3 speed—List $31.95
16″ Osc.—3 speed—List $39.95
19″ Non Osc.—3 speed—List $39.95
19″ Osc.—3 speed—List $45.00

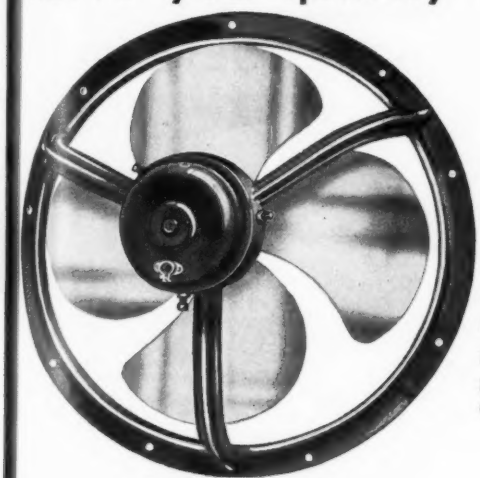
DESK FANS

16″—Osc.—3 speed—	**List $26.95**
12″—Osc.—3 speed—	**List $17.95**
12″—Osc.—2 speed—	**List $12.95**
10″—Osc.—1 speed—	**List $ 9.95**
10″—Osc.—1 speed—	**List $ 7.95**
10″—Osc.—1 speed—	**List $ 6.95**
10″—Non. Osc.—1 speed—	**List $ 5.50**

% Jobber Line

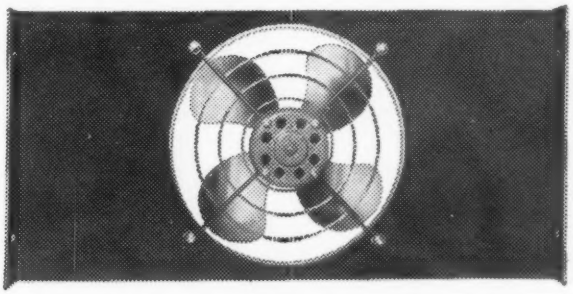
The Leaders in Style, Quality and Price are now in position to serve you quickly from Three Southern Offices

New Revolutionary Type
SENTINEL RUBBER BLADED FAN
100% Rubber Blade Molded
in One Single Piece.
10″—Osc.—2 speed— List $10.95
10″—Non. Osc.—2 speed— List $ 8.95
10″—Pedestal—Osc.—2 speed—List $14.95

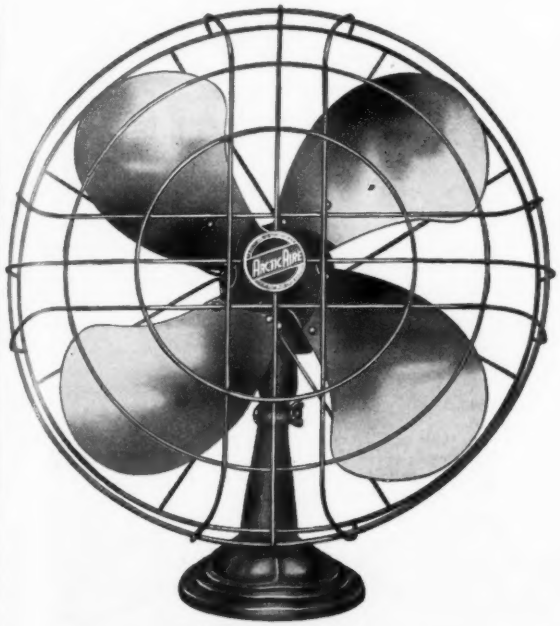


VENTILATORS
(1 speed only)
10″— List $10.95
12″— List $16.95
16″— List $21.95
19″— List $26.95

Within a few short years ARCTIC AIRE Fans have won an enviable position as a leading line of QUALITY FANS. They have "Sales Appeal" because of up-to-the-minute design features and "Price Appeal" because of the unusually low prices on even the deluxe models. Over a million fans already in use.



KITCHEN VENTILATOR (Adjustable Window Type)
10″—1 speed—List $8.95



GIANT DESK FAN
19″—Osc.—3 speed— List $31.95

Dealers can sell the ARCTIC AIRE Line with complete confidence in their ability to render long years of trouble-free performance. Every fan is backed by an iron-clad policy of strict adherence to engineering perfection and precision manufacture. Embodying modern streamline design features and mechanical improvements, together with unusual low prices, the ARCTIC AIRE line offers sales opportunities and generous profits for the dealer. Hop aboard this band wagon and let ARCTIC AIRE make money for you.

Write today for full information and money-making plan.

F. A. SMITH MANUFACTURING CO., INC.
Rochester New York

SOUTHERN OFFICES:

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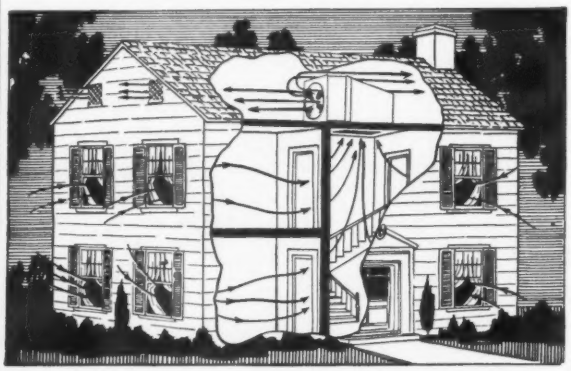
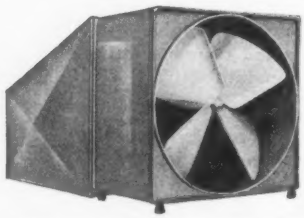
There's No Time to Lose!

Don't wait until hot weather arrives . . . when competitors have the jump on you. Plan now to share in the big profits of this rapidly growing home cooling market. Our complete sales plans will assist you and make your sales work doubly effective. .



REX AIRATE ATTIC VENTILATORS

REX AIRATE attic ventilators are easy to sell . . . easy to install. They are complete package units, including vent-box, rubber connector, fan unit, ceiling moulding and an automatic ceiling shutter with vanes that open and close as the unit starts and stops.



Furnished in various sizes for all types of installations.

---FOR ADDITIONAL INFORMATION MAIL THE COUPON---

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DIV. OF THE CLEVELAND HEATER CO.
1933 WEST 114TH ST., CLEVELAND, OHIO

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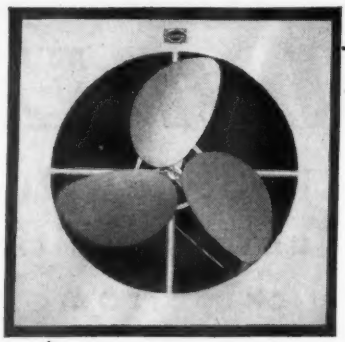

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NEW, 1939 COOLVENT

Quieter! Handles More Air!

★ New fan wheel handles greater volumes of air at slower speeds. Exclusive twin rubber mounted ball bearing pillow blocks and resilient base type semi-enclosed motors designed for quieter operation and trouble-free service. Write for new illustrated bulletin and price sheet today!

CERTIFIED RATINGS

★ For Your Protection COOLVENT ATTIC FANS are tested and rated in accordance with standard test code as adopted jointly by Nat'l Ass'n of Fan Mfgrs., and Amer. Society of Heating & Ventilating Engineers.

Insist on CERTIFIED RATINGS *Install* AUTOVENT *Ventilation*

AUTOVENT FAN & BLOWER CO.
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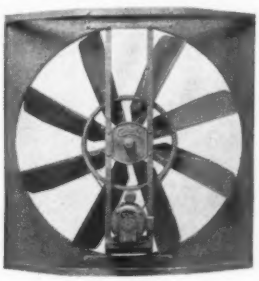

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Comfort Cooling BUILDS YOU UP
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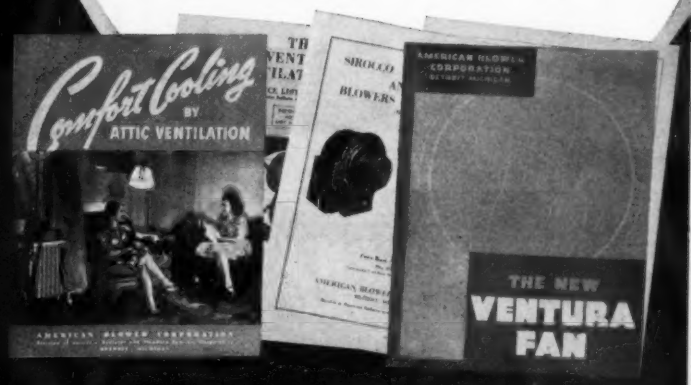

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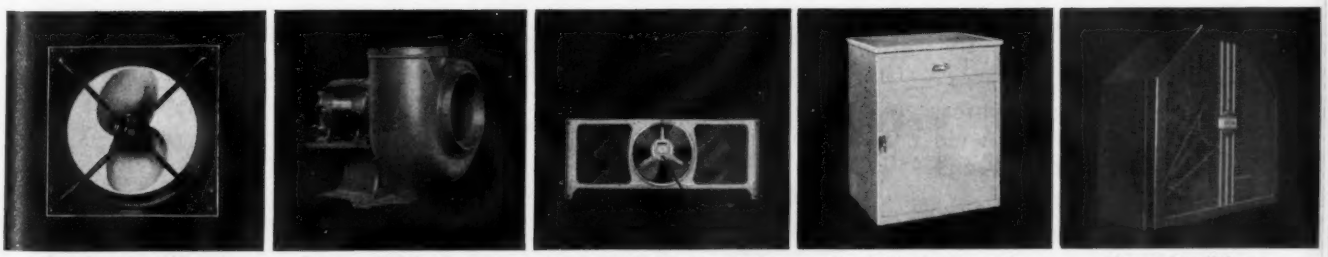

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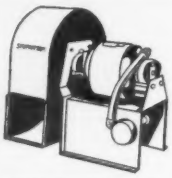

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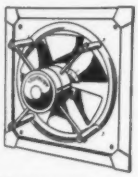

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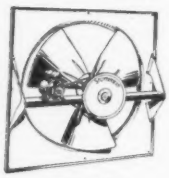
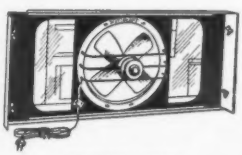


ATTIC FANS



WINDOW FANS

FIGHT ?

Certainly! We're always ready to roll up our sleeves and really get to work—to help our contractor customers land ventilating jobs.

Your request for this cooperation—or for assistance in laying out and figuring ventilation jobs—would be welcomed at any time.

Prompt shipment of Sturtevant Fans—from our distributors' local stocks.

B. F. STURTEVANT COMPANY, Atlanta, Georgia—Greensboro, N. C.—Richmond, Va.
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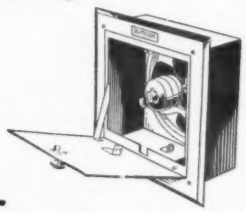

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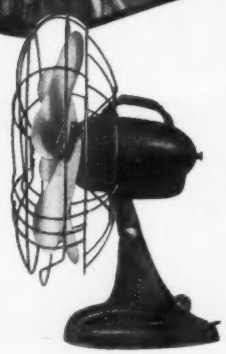

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Offices in all principal cities

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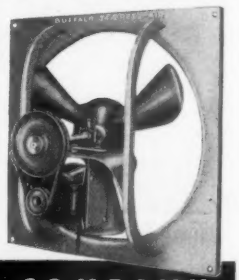
$29.50
LIST

This Is Your Market for BREEZ-AIR ATTIC FANS

Homes of the type illustrated represent an excellent market for Buffalo Attic Fans. Therefore, *your* sales opportunities are limited only by the number of such homes in your territory.

Distributors and dealers who never before sold Attic Fans have done remarkably well the very first season with Buffalo Breez-Air line and our complete sales promotion and merchandising program.



Write today for details. Be prepared to get your share of the profits on this "natural" hot weather item.

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210 MORTIMER STREET BUFFALO, N. Y.
CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONTARIO

Refrigeration Valve Service Problems

(*Continued from page* 30)

domestic refrigerator compressor was locked on the vertical wringer shaft and with a corresponding eccentric strap and rod it was connected to the rod holding the valve plate, this moved them back and forth while the disc was oscillating backwards and forwards against the surface. For a lapping compound we purchased a liquid with an affinity for water and cut it with water to a very low viscosity. That this liquid compound might smoothly flow over the disc during operation, the original washing machine pump, used to remove water from the tub was connected with small copper tubing to a reservoir that had been built under the disc to catch the compound as it flowed off and return it to the top of the disc where a piece of copper tubing with small holes in it distributed it again over the disc. To keep the metal disc true another piece of similar metal is being used to grind the two pieces of metal together occasionally.

This piece of machinery is now in operation and has fulfilled our expectations at a relative small outlay. The number of valve plates that it will lap at one time naturally depends on the size of the plates, with a maximum of four small plates. It has not been intended to take the place of a grinding or resurfacing machine that would be necessary to use on a deeply pitted plate. A machine that would handle such heavy grinding and yet hold tolerances within a few thousandths of an inch would probably be prohibitive in cost for the small shop.

Too much emphasis cannot be placed on the importance of having each valve in a refrigerator system functioning properly. It is impossible for any one to be absolutely positive about the condition of valves without installing a high and low presure gauge on the job and making a thorough analysis. Many experienced men make an attempt to do so and part of the time they may be right but in an equal number of cases they are wrong.

My experience indicates that you will do a better job by making a practice of always installing your gauges on every job before making a decision.

THESE ARE

BRASS TACKS!

For three months now, we've been asking you in this space to look at General Electric's 1939 Fan Portfolio entitled, "Let's Get Down to Brass Tacks!" We hope that you've already done so, but just in case you haven't, here in brief, is the story that the Portfolio tells. (If this isn't "getting down to brass tacks" we'll gladly eat a handful of 'em!)

General Electric Fans have been consistently advertised to the public for a long period of years. Again this year, General Electric steps out with a forceful promotional program that is designed to do just one thing—help General Electric Fan Dealers sell more General Electric Fans.

Included in this year's kit of hard-hitting advertising helps—all of this material is free—you will find:

(A) A colorful action display that attracts attention—and customers!

(B) Smart catalogs that contain complete selling facts!

(C) Convincing direct-mail pieces that carry your message far and wide!

(D) Attention-getting newspaper mats for local use!

(E) Powerful national newspaper ads in more than 175 key cities!

Tie-in with G-E Fans this year! We offer you a respected name, an accepted product, and a consistent and effective advertising program. Do not these things enhance your profit opportunity? Don't delay. SIGN THE G-E FAN AGREEMENT—NOW!

FREE!

EVER SEE A BRASS TACK?

You've heard lots of people talk about Brass Tacks but did you ever see one? Paste this coupon on a penny post card and we will gladly send you one—solid brass and no fooling—free!

FAN SALES SECTION, APPLIANCE AND MERCHANDISE DEPARTMENT
GENERAL ELECTRIC CO., BRIDGEPORT, CONN.

FANS

Please send me one of those Brass Tacks.

Name.....

Street & No.....

City.....

GENERAL ELECTRIC

SEE THE G-E "HOUSE OF MAGIC" AT BOTH FAIRS

Industry Faces Future Labor Shortage

(*Continued from page* 20)

The first step, Mr. Reynolds believes, would be for the contractors to point out the need to union leaders and secure their cooperation in formulating a satisfactory apprentice system to avoid depopulation of the skilled workers' ranks. He believes there would be no lack of young men to enter apprenticeship and points out the inevitable difficulty to builders and electrical contracting and engineering companies if no training schedule is established and a scarcity of competent workers occurs.

Notes on Fluorescent Lamp Installation

(*Continued from page* 22)

because such treatment may place a greater burden on the electrodes causing them to operate too cool and to be bombarded too severely. Excessive voltage causes a shortening of the life because of the more rapid use of the active material on the electrodes. Enough data are not yet available to determine the magnitude of under and over voltage operation on lamp life. For the present it appears that from the standpoint of lamp life, lamps should be operated within 10 per cent above and below the center of the recommended voltage range.

(14) How much fluctuation in voltage will the lamps stand without going out or failing to start?

Lamps should not go out if the voltage is above 100 volts on 115-volt circuits and above 200 volts on 230-volt circuits. Starting may be troublesome below 105 and 210 volts on 115 and 230-volt circuits respectively.

Sell Doctors First to Promote Attic Fans

(*Continued from page* 8)

only $6.00 extra for the time switch, this feature reduces cost of operation and increases customer satisfaction. People can set the time switch to operate for two hours after they go to bed when cooling is needed, then it cuts off without the sleepers getting chilled and taking cold late in the night when the building is cool."

Mr. Booth finds his best sales argument is to refer a prospect to any user of an attic ventilating system. He shows the owner of even four and five room houses that they can obtain a cooling system for as little as $150 which will operate for $1.25 per month—and he also shows the owner of fine homes that he has adequate size systems for such homes. In a number of instances, he installs two fans to handle the load, making such installations cost but $550 or $600. Many systems at $300 are sold, while an average and the most popular price is $175 and up.

"Selling attic ventilating," says Mr. Booth, "is not so much an engineering job as that of a selling job. By merely getting adequate intake and outlets, the system can be made successful, the size of the grille in the pent house for the fan depends entirely upon the size of the fan and the volume of air to be moved. We make it a point to have the outlet louvers slightly larger than the inlet grille so that there will be no back pressure in the attic.

Theatre Lighting In Modern Style

(*Continued from page* 17)

cuit from the operator's booth.

Under-balcony niches are lighted by S-11, ten-watt amber bulbs in porcelain reflectors. Overhead light is provided by 50-watt incandescent bulbs, concealed by a wide plaque. They are also on a master dimmer circut, controlled from the operator's booth. The light observed in the photograph at the edges of ceiling at corners of room is reflection.

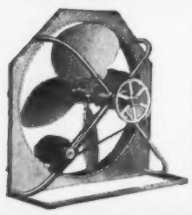
Ultra-Violet Light Used

Interior beauty of the auditorium is enhanced by two statues near the screen one on each side, each in a niche placed at an angle to the stage. These statues are more than seven feet high and embody what is said to be the first application of the so-called "black light" in Dallas.

Ultra-violet rays, quiet detectable by the camera lens but invisible to the human eye, are concentrated on each statue from three 100-watt, red-purple mercury bulbs recessed in concentrating refrectors, one above and two below each figure. Fluorescent paint on the statues transforms this light in a manner that causes each figure to glow in its darkened niche. Though the spotlights show in the picture, they are not visible to the human eye in the theatre. The effect is beautiful and fascinating.

All wiring in the Lakewood Theatre was handled by the Hall Electric Company, of Dallas. Electrical features were designed by J. H. Elder and E. C. Zrenner, both of the Interstate Amusement Company.

Send for this FREE Book



★ Install MODERNAIRE Attic Fans for Summer cooling of homes, apartments, hotels, stores and offices. Unlimited opportunities. We show you how. Write today for information on the MODERNAIRE Attic Fan franchise in your territory.

"Modernize with Modernaire!"

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1115 HALL ST. DALLAS, TEXAS

A BUYING HELP

ELECTRICAL SOUTH will gladly help you do your buying. Tell us what you want and we can save you time and postage.

The manufacturers who advertise in ELECTRICAL SOUTH, in nearly every case, have representatives located throughout the South and have distribution facilities to give the Southern trade prompt and efficient service.

Look over the advertisements in this issue of ELECTRICAL SOUTH, send us a list of the ones you are interested in, and we will have the manufacturers send you further information about their products. No obligation to you.

ELECTRICAL SOUTH
Grant Building, Atlanta, Georgia.

MOTOR Service

TURNING BELT, STEEL CLAMPS, FOR ARMATURE WORK

By A. C. Roe

Railway Motor Engineer
Westinghouse Electric & Mfg. Co.

WHERE a number of large size d-c armatures must be handled there are two handy devices that will prove useful and easy to make. One tool is an adjustable turning belt; the other, a pair of steel clamping rings for the coil ends. Both of these tools are shown in use on an armature in accompanying illustrations.

Construction details of the turning belt are shown in the accompanying sketch. It consists of a long piece of leather belting approximately 1/4 inch by 3 inches. This size can be modified to suit different ranges of armatures. One end of the belt is fastened to the wood base of the handle as shown. A piece of wood is screwed on over the belt. On the opposite side an eye-type buckle is fastened to the wood handle as shown. The free end of the strap is tapered and holes punched 1/2 or 3/4 inch apart.

Using the Belt

The belt can be used on the commutator to turn the armature during winding. It can be used with the buckle up but, either way, the buckle will not damage the surface around which it is clamped. Less stress is placed on the buckle, when used as shown in the illustration.

In use the belt is snapped around an armature, the slack pulled out and the belt buckled. The buckle being on the side in which direction the armature is turned. Pulling down on the handle snubs the belt and turns the armature, lifting up on the handle releases the snub permits turning the belt for a new bite.

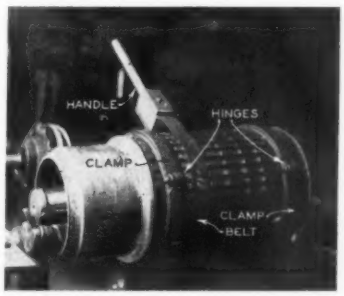
The steel clamps are made from cold rolled steel 3/8 inch or 1/2 inch thick by 2-1/2 inches wide, made as shown in the diagram. The hinge is made around a 1/2 inch bolt by cutting out the ends of each half and forming a double eyelet on one half and a single eyelet in the center of the second half.

Construction of Clamps

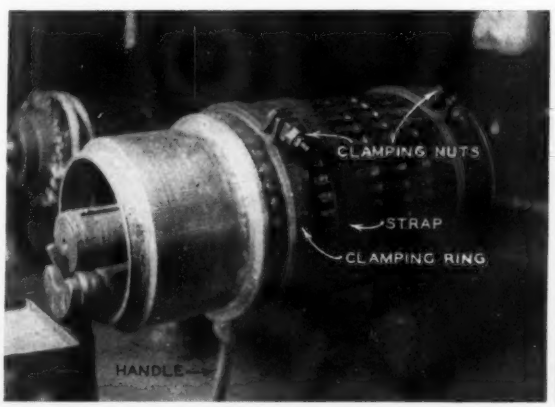
The other end of each half is turned up at right angles as shown, and drilled to receive a 1/2 inch bolt and nut for clamping the ring tightly about the armature.

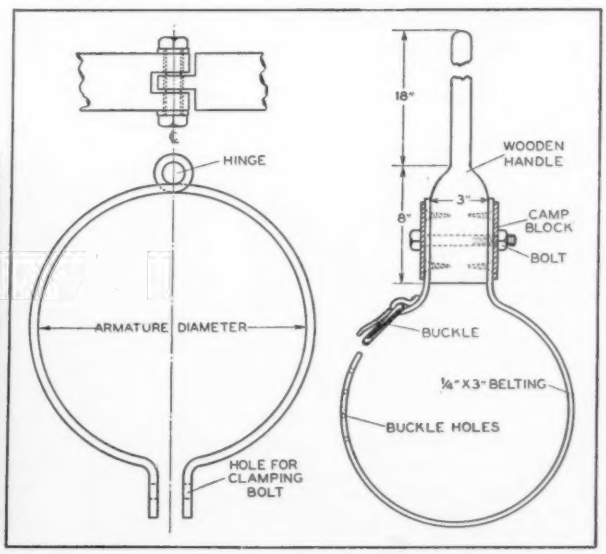
In use, a layer of insulation is wrapped over the coil ends. This can be a double layer of .017 inch drilling on canvas. The clamps are applied and pulled up tight by means of the bolt. These clamps pull the winding up tight before soldering the commutator necks and hold the windings until core bands, etc., can be applied.

The dimensions of the belt and clamps can be varied to suit various types of armatures, large or small, and they will be found most useful.



The handy turning belt and steel clamps described here will greatly facilitate work on large size d-c armatures. Below, the devices are shown in place on an armature; at right, construction details are given.





Correcting Motor Switch Troubles

By Jack Beater

ENGINEERS design new motors with considerable thought and care but it sometimes happens that they do not foresee some of the things that will develop after the motor has been in service for a year or two. When these "bugs" appear, it is up to the service man to correct them.

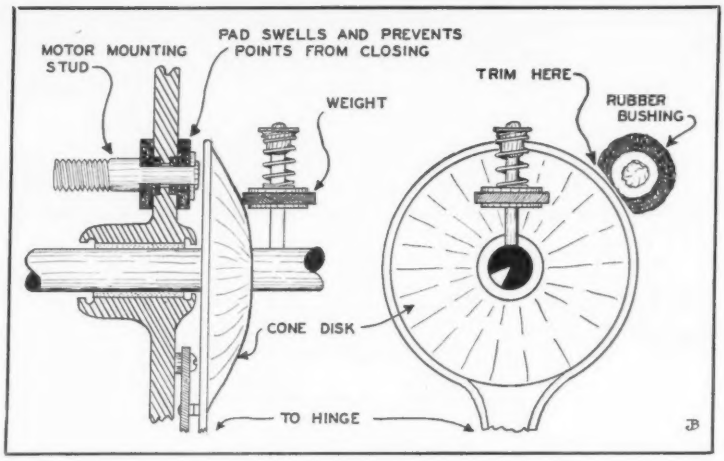
Such a condition, to name one instance, has developed in the centrifugal switch of one recently introduced motor. This type of motor is used in refrigeration work and is quite popular. The aim in designing this switch, which differs radically from previous types, was to reduce manufacturing costs, and simplify and improve the mechanism.

Instead of the former hinged weights, springs and bakelite thrust collar, this rotor shaft carries a single stud supporting a circular felt rimmed washer and a small coil spring. At rest the spring forces the washer close to the shaft, but at running speed the washer moves out on the stud and compresses the spring.

The contact plate is cone shaped so that when the motor is at rest the felt rimmed washer presses against it and closes the concealed contact points. At the higher speeds, the washer travels toward the outer edge of the cone, allowing the cone to move on its hinge and open the contacts.

This switch proper has little to get out of order, and in comparison with the number of these motors in use, the initial design of the switch can be considered very satisfactory. All the trouble experienced in the field has been brought about by the method of mounting these motors to the base which, in time, causes the switch to become inoperative.

The motor is mounted to the base by means of two studs, so that it can be adjusted to obtain the proper tension on the belt. These studs in turn are mounted to the motor by means of a rubber-canvass bushing so as to eliminate noise and vibration. The rear stud bushing comes under the outer edge of the cone-shaped switch contact plate. When the motors are new and the rubber bushing is of normal size this method of mounting the motor is quite all right.



In time, however, oil seepage gets to the rubber bushing and causes it to swell and spread. The swelling of this rubber bushing sooner or later prevents the cone shaped contact plate from going back to its normal position when the motor stops, the contacts are then held open and the motor does not start the next time. If not detected in time this open circuiting of the condenser or starting winding will cause the motor to stand still and burn out.

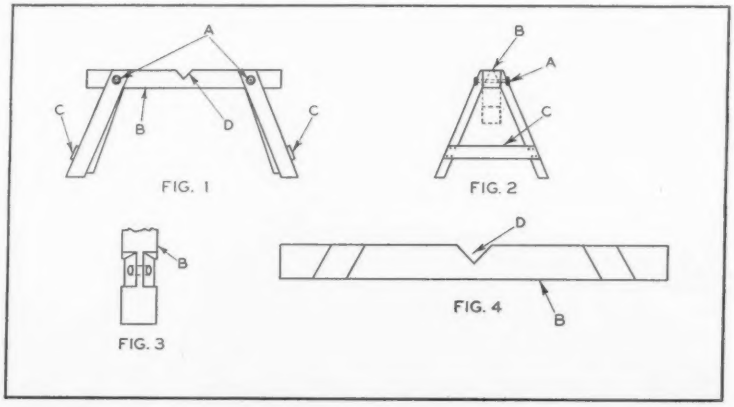
The correction of this trouble is very simple when the cause is once discovered. The edge of the rubber bushing that extends slightly under the cone shaped contact plate is trimmed off with a sharp knife. This allows the cone plate to again move freely within its proper limits, and the motor will function properly. Trimming the edge of this rubber bushing on all motors of this type that come to the motor shop will eliminate the possibility of future trouble.

Trestles Facilitate Motor Repair Work

By Thomas Trail

IN working on motor or generator rotors when they are removed from the machine, it is at times convenient to place them on a pair of trestles. The accompanying sketches show a method of constructing a sturdy pair of trestles that may be easily dismantled so as to conserve space in storing them away. Fig. 1 shows a side view of a trestle. "D" is a V-shaped notch in the top of the trestle to accommodate one end of a rotor shaft. Fig. 2 shows an end view of a trestle. Fig. 3 shows how the top timber "B" of the trestle is notched at each end so as to hold the trestle legs rigid.

In dismantling these trestles, the bolt "A" is removed from each end of the trestle, and top timber "B" lowered from its assembled position, as shown by the broken lines in Fig. 2.



CODE Discussion

UNDERSTANDING AND USING THE NATIONAL ELECTRICAL CODE

Part I-- Introduction

By B. Z. Segall

THE 1937 revision of the National Electrical Code is the first major "face-lifting" operation it has had in about fifteen years. It presents in form, at least, a radically different code. As such, it has been accredited with many evils, contradictions and paradoxes. Actually, this 1937 code is a clearer exposition by far, of the rules governing electrical installations than any of the former codes. A careful analysis of the code format and the code wording will show that the 1937 edition is a most progressive code.

Before making a detailed analysis of the code it will be well to have a bird's-eye view of its arrangement. The first four chapters contain all the rules of general application. The next four chapters augument these rules with amendatory requirements for special materials, equipment, occupancies and systems. Then all the tables, diagrams, etc., have been assembled into a separate chapter.

This arrangement certainly is a marked improvement over the old codes with their wire tables, protection diagrams and other design information scattered throughout the various chapters and sections of the code. Finally, all the construction specifications have been re-edited into a separate chapter. This expedites the inspector's, architect's, and engineer's work in the inspection and design of electrical material and equipment.

A quick survey of the code will certainly show that all the rules are in a logical sequence, all the amendatory requirements are definitely stated. The entire code is correctly tied in with cross-references so that all exceptions, all special requirements and all amending rules for any system, material, equipment or occupancy are instantly noted and therefore easily found.

The code book is opened and our eyes strike the opening pages of an Introduction. Here is a major change in the code, a definite breakaway from any electrical code we have had before. For the first time our code does not leave to hearsay or arbitration its purpose and intent. We definitely know that all electrical wiring in public and private buildings not intended for use by electric or communication utilities for housing their generation or exchange facilities, must conform to the rules set up by the code.

The application of code rulings to the wiring of these utility facilities has been a question often raised by inspectors. It is now recognized that these are basically service facilities. They must of a necessity be inherently safe and adequately designed for rendering a dependable source of energy for a highly developed electrical civilization. The purpose of the National Electrical Code is no more an indefinable thing; it is positive, tolerant, and flexible.

In the statement of the scope of the code we again find a clarification of the intent of the rules. For the first time the code states that it is a *minimum* standard. In the past, too much reliance has been placed on the code rules per se, for adequacy and proper design. The code should be "regarded neither as a design specification nor an instruction manual for untrained persons." The minimum requirements are set forth, but these must always be tempered with the contractor's ability to properly engineer the installation so that at all times the ultimate consumer may obtain full use of his service.

It is important for the architect, the engineer, and the contractor to realize that the consumer is not interested in paying for line drop, inefficiency of washing machines, poor refrigeration, inferior production due to poor voltage regulation. A number fourteen wire may satisfy code requirements but may be far from adequate in satisfying production needs. Competition is keen but many a contractor has lost a second call from a past customer because he lost sight of the fact that he set too keen a point on his pencil and not keen enough an edge to his thinking. Good engineering, sound salesmanship and the code are the standards for satisfactory service.

The introduction goes on further to recommend and clarify other engineering principles which should be applied to all layouts. Planning for the future increases is much more economical if done before a job is completed than having to take care of additional load after an electrical system has been installed. Extra conduits and larger raceways if they will be needed at a later date should always be provided on the original installation.

Another important statement is contained in the section on Enforcement and Interpretation. Here is definitely pointed out the responsibility of the enforcing authority. His duty is three-fold; (1) interpretations of rules, (2) approval of material and equip-

(*Continued on page* 70)

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This is the first of a series of articles discussing and explaining the National Electrical Code. Mr. Segall is well-known in the South not only for his extensive knowledge of the Code but also for his knack of explaining its difficult sections. These articles will represent a comprehensive study course on the Code and its application and should provide good discussion material for Code study groups and meetings.

ENGINEERING SECTION

Expulsion Tubes Greatly Reduce 110 kv Line Flashovers

By F. H. Meece
Transmission Department
Carolina Pow. & Lt. Co.

THE Carolina Power & Light Company has 26.3 miles of single circuit steel tower line and 17.8 miles of wood H-frame line operating at a voltage of 110 kv, fully equipped with expulsion protective gaps. In addition there are 92.4 miles of double circuit steel tower line partly equipped with expulsion tubes. For the latter, the percentage of structures equipped with expulsion tubes is 29% and the operating voltage is 110 kv.

The Laurinburg - Abbottsburg section of the Laurinburg-Wilmington Line (see Fig. 1), which interconnects the Carolina Power & Light Company and Tide Water Power Company systems, is the only line fully equipped with the tubes. This interconnection was effected in 1934 by building 65.8 miles of wood H-frame line from Lumberton to Wilmington, and using an existing steel tower line from Laurinburg to Lumberton, of 26.3 miles in length.

Since a large proportion of the Tide Water Power Company load was to be supplied over the Laurinburg-Wilmington line it was considered necessary to make the line as near lightning proof as practicable economically, in order to obtain a high degree of operating reliability on both the existing and the new lines.

Overhead ground wires were considered, but to make this form of protection effective, a counterpoise system of grounding would have been required. In addition to an expensive counterpoise system, the existing tower line would have required one additional overhead ground wire. These ground wires, to be effective, would have necessitated an extension to the towers to obtain a greater distance between the power conductors and the ground wires. With increased tower heights for this purpose, wind loading would have been materially increased on the towers and due to their relatively low strengths, tower failure might have resulted. The new wood H-frame line would have required longer poles to support overhead ground wires, as well as additional hardware.

After careful consideration of these facts, the expulsion protective gaps were chosen to protect this line because it was believed they would give reliable protection to the line and could be installed more economicaly.

Description of Line

The Laurinburg-Lumberton section of this line consists of 44 double circuit steel towers and 172 single circuit steel towers all of the same type except that the single circuit towers are shorter and have only three conductor positions. The double circuit towers support a 22 kv line on the north side in addition to the Laurinburg-Lumberton 110 kv line.

Both the double circuit and single circuit towers have one overhead ground wire of 3/8" stranded steel supported at the center of the tower and about 8 feet above the top conductor for the single circuit and 10 feet above the top conductor for the double circuit towers. The line conductors are No. 2/0 ACSR with a vertical spacing of 9 feet, and a horizontal distance of 15 feet between circuits.

The structure ground resistances are the resistances of the tower footings. No counterpoise system or auxiliary grounds have been installed. No data are available on the ground resistances of the tower footings for this section of line, but it is assumed that the tower footing resistances are higher for the average value than the pole ground wire resistances of the wood H-frame structures on the new line due to the effect of guy wires in lowering the ground resistances of the ground wires on the wood pole structures.

The Lumberton-Abbottsburg section of this line consists of 155 single circuit wood H-frame structures without overhead ground wires or extensive counterpoise system. The conductors are No. 4/0 ACSR with 12.5 feet horizontal spacing. Insulation is 6 standard 10" units for suspension and 7 standard 10" units for strain structures. Each pole has a ground wire of No. 4 galvanized steel which extends a few inches above the pole top. This ground wire is brought down the pole, passed under the bottom end and wrapped 8 times around the lower end of the pole. Each turn is fastened with a staple where it crosses the vertical wire and the vertical wire is fastened to the pole with staples.

Ground Resistance

All of the pole grounds except five measured between 2 and 260 ohms resistance. The resistances of these five grounds were reduced to a value below 300 ohms by driving a ground rod about 3 feet from each pole and connecting these auxiliary grounds to both pole ground wires. Except at these five structures the pole grounds are interconnected only through the steel cross arm used for mounting the expulsion tubes, but the resistances were found to be the same for the two pole grounds at all the structures. These resistance

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**Adapted from an address before the Engineering and Operation Section of the Southeastern Electric Exchange, Raleigh, N. C., Feb. 23 and 24, 1939.*

values are believed to be very nearly maximum since the tests were made during dry weather.

Expulsion Protective Caps

On the steel tower section of this line, the expulsion tubes are attached to a counter weighted arm which is fastened to the top of the insulator string by a special fitting. The tube hangs downward from the end of this arm, making an angle of about 30 degrees with the vertical forming a gap between the end of the tube and the conductor at a point about 2 feet from the center of the insulator string. The external gap setting for this section of the line is 11 inches.

The wood H-frame section of this line has three tubes mounted in a vertical position directly underneath the conductors on a steel channel cross arm. The channel iron cross arm is connected to both pole ground wires. The external gap setting for the tubes on this section of line is 11 inches.

Operation Record of the Line

Switching of the line at the Laurinburg end is by means of an oil circuit breaker equipped with automatic reclosing devices to give one high speed reclosure within 30 cycles and one delayed reclosure 5 seconds later. Relaying of the line is provided by instantaneous relays; the phase relays being set for 528 amperes and the ground relay for 180 amperes. These relays operate in 3 to 4 cycles. Additional overload relaying is provided by induction type overload phase relays with a current setting of 150 amperes and an induction type overload ground relay with a current setting of 120 amperes. The time lever setting for the phase relays is 5 and for the ground relay is 5.5.

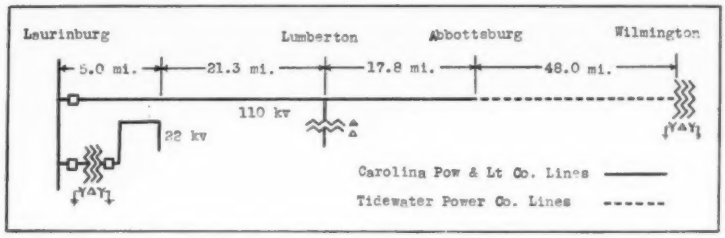


Fig. 1. One-line diagram showing sections of 110 kv transmission lines protected by expulsion gaps.

The following record shows the number of operations of the oil circuit breaker at Laurinburg attributed directly to lighting from June 1, 1934 to December 31, 1938.

1934: 15 operations. Total outage time 1 minute, 30 seconds.
8 operations when the line was good after the instantaneous reclosure; outage time about 4 seconds.
3 operations requiring two reclosures; outage time about 26 seconds.
4 operations requiring three reclosures—two by automatic reclosing equipment and one manual; outage time about 1 minute.

1935: 5 operations. Total outage time about 13 seconds.
3 operations when the line was good after the instantaneous reclosure; outage time less than 2 seconds.
2 operations requiring 2 reclosures; outage time 11 seconds.

1936: 8 operations. Total outage time 13 seconds.
6 operations when the line was good after the instantaneous reclosure; outage time 3 seconds.
2 operations requiring 2 reclosures; outage time 10 seconds.

1937: 13 operations. Total outage time 56 seconds.
5 operations when the line was good after the instantaneous reclosure; outage time 2½ seconds.
7 operations requiring 2 reclosures; outage time 38½ seconds.
1 operation requiring 3 reclosures; outage time 15 seconds.

1938: 7 operations. Total outage time 18 seconds.
4 operations when the line was good after the instantaneous reclosure; outage time 2 seconds.
3 operations requiring 2 reclosures; outage time 16 seconds.

During the 4 1/2 years covered by this record, there were no pro-

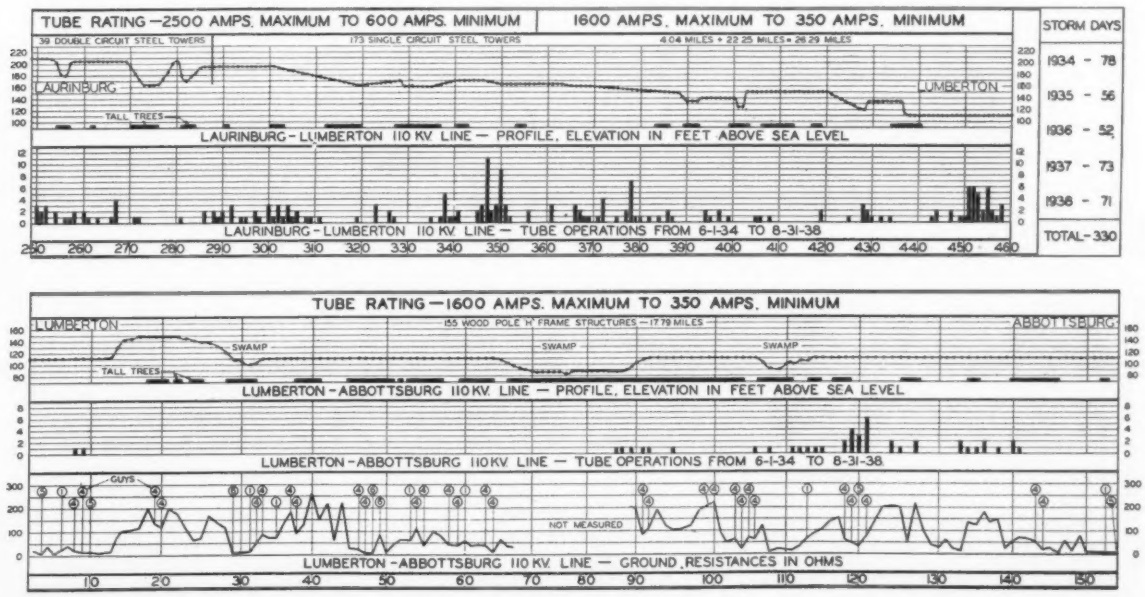

TUBE RATING—2500 AMPS. MAXIMUM TO 600 AMPS. MINIMUM
1600 AMPS. MAXIMUM TO 350 AMPS. MINIMUM
39 DOUBLE CIRCUIT STEEL TOWERS
173 SINGLE CIRCUIT STEEL TOWERS
4.04 MILES + 22.25 MILES + 26.29 MILES
LAURINBURG
LUMBERTON
TALL TREES
LAURINBURG - LUMBERTON 110 KV LINE — PROFILE, ELEVATION IN FEET ABOVE SEA LEVEL
LAURINBURG - LUMBERTON 110 KV LINE — TUBE OPERATIONS FROM 6-1-34 TO 8-31-38
STORM DAYS
1934 - 78
1935 - 56
1936 - 52
1937 - 73
1938 - 71
TOTAL - 330
TUBE RATING—1600 AMPS. MAXIMUM TO 350 AMPS. MINIMUM
LUMBERTON
155 WOOD POLE H FRAME STRUCTURES—17.79 MILES
ABBOTTSBURG
SWAMP
TALL TREES
LUMBERTON - ABBOTTSBURG 110 KV LINE — PROFILE, ELEVATION IN FEET ABOVE SEA LEVEL
LUMBERTON - ABBOTTSBURG 110 KV LINE — TUBE OPERATIONS FROM 6-1-34 TO 8-31-38
GUYS
NOT MEASURED
LUMBERTON - ABBOTTSBURG 110 KV LINE — GROUND RESISTANCES IN OHMS

Fig. 2. This chart shows tube operations and other essential data pertaining to the line in Fig. 1

longed line outages attributed directly to lightning, although there was some conductor burning on the steel tower section of the line. All sections of burned conductor were replaced as soon as found, but two line outages due to wind and sleet were thought to have been caused by previous burning of the conductor.

During 1935 burned conductor was replaced at two towers. In 1937 an effort was made to find and repair all such damages, and damaged sections of conductor were replaced at 12 places near the insulator clamp and expulsion tube and at two points on the line between towers.

During the early part of 1938, armor rods were installed on all towers and at this time 14 sections of damaged conductor near the suspension point and 2 sections near the center of the span were replaced. The entire line was carfully inspected for conductor burns while the armor rods were being installed.

Armor Rods Installed

These armor rods are about 8 feet long and ten are required for each installation. They extend from a point about 1 foot from the center of the insulator through the conductor clamp and beyond the gap at the end of the expulsion tube.

Experience with the operation of this line during the lightning season last year indicates that the armor rods will be effective in reducing conductor damage due to expulsion tube operations and arc over from the conductor to nearby parts of the tower.

During the 4 1/2 year period covered by this report, there were 12 line outages not attributable to lightning. In 6 cases the line was good after one to three reclosures and in 6 cases the faults remained on the line after three reclosures. All of these 6 faults occurred on the steel tower section of the line. Two were caused by ice, 2 by wind when two towers were blown down, 1 by an automobile wrecking a tower and 1 by undetermined cause. The total outage time for the line due to these faults was 39 hours and 37 minutes.

The total outage time for the same period due to lightning was 3 minutes and 10 seconds caused by 48 tripping operations at Lauringburg. Twenty-four of these were thirty cycle interruptions which in some cases did not cause a shutdown of motor load. A 5000 kva synchronous condenser and about 3000 kva of synchronous motor load in and around Wilmington is usually shut down by these 30 cycle interruptions, but the other load usually is not affected. Under-voltage tripping devices for the condenser and the synchronous motors are set for a very short time to prevent sustaining the arc when an insulator flashover occurs.

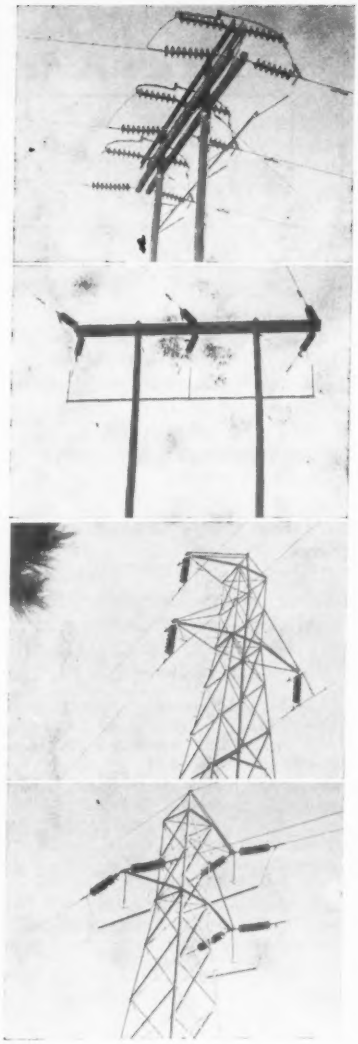


Fig. 3. Methods of mounting the expulsion tubes on different types of structures are shown here.

Record of Expulsion Tube Operations

The record of expulsion tube operations indicates that a number of line interruptions have been prevented by operation of the tubes to relieve the over-voltage condition caused by lightning discharges. It it believed that the record of these operations is incomplete and that there were many more successful tube operations of which there is no record.

The expulsion tubes are equipped with operation indicators from which the tube operations are determined by inspection on the line patrols. These operation indicators are hand reset, therefore, a tube can operate several times between patrols, but only one operation will be recorded.

The following tabulation gives the record of tube operations since the line was put in service as an interconnection between the two systems in 1934:

Tube Operations

Year	Tower Line	H-Frame Line	Storm Days
1934	92	22	78
1935	37	7	56
1936	24	3	52
1937	32	35	73
1938	18	19	71
Total	203	86	330

Of the tube operations on the double circuit steel tower line 47 per cent were on the top wire, 32 per cent on the middle wire and 21 per cent on the bottom wire. The three conductors are suspended in the same vertical plane. On the single circuit tower line the tube operations were distributed as follows: 30 per cent on top wire, 32 per cent on the middle wire, indicating less effective shielding of the bottom wire. Seventy per cent of the tube operations on the wood H-frame line were on the two outside wires and 30 per cent on the middle wire.

Available operating data for the wood H-frame line did not show any effect of various ground wire resistances upon the number of tube operations at a particular structure. No tube failures have occurred on this section of line although some of the ground resistances are well over 200 ohms, it appears evident that the ground resistances are not high enough to prevent normal expulsion tube operation.

If the tube is able to carry the power follow current long enough for the relays and oil circuit breaker to operate, the tube operation at a point of unusually high resist-

(*Continued on page* 69)

Technical Program Planned for Southwest A.I.E.E. Meeting

WITH a program planned to include some papers of interest to electrical engineers in practically every phase of the industry, it is anticipated that the annual meeting of the Southwest District, American Institute of Electrical Engineers, will be attended by several hundred engineers and engineering students.

Scheduled for April 17, 18 and 19, the meeting will have its headquarters in the Rice Hotel, Houston, Texas. Registration will begin Monday morning at 8:00 A. M. The meeting program follows.

Program

Monday, April 17, 10:00 A. M.

Announcements, F. C. Bolton, vice-president, Southwest District.

Address of Welcome, H. O. Clarke, Jr., vice-president, Houston Lighting and Power Company.

Presiding: E. A. Heath, Kansas Gas and Electric Company and C. F. Terrell, Gulf States Utilities Company.

Electricity in an Oil Field Equipment Manufacturing Plant, Seth Evans, Hughes Tool Company, Houston.

The Mountain Creek Plant, H. K. Doyle, Dallas Power and Light Company, Dallas.

Resonant Type Constant Current Regulators, R. R. Miner, Kansas Gas and Electric Company, Wichita.

Monday, April 17, 1:30 P. M.

Three major inspection trips are scheduled for this period. Trip No. 1 will include the Deepwater Power Plant and the Champion Paper and Fibre Company plant. Trip No. 2 will include points of interest in local and toll offices of the Southwestern Bell Telephone Company, the underground networks of the Houston Power and Light Company, and air conditioning installations in several buildings. Trip No. 3 will include an inspection of the turning basin, San Jacinto Battleground, and Radio Stations *KPRC* and *KTRH.*

Monday, April 17, 6:30 P. M.

Stag Supper, Gulf Brewing Company.

Tuesday, April 18, 9:00 A. M., Technical Session

Presiding: H. P. Lawther, Southwestern Bell Telephone Company and J. W. Ramsay, University of Texas.

Line Problems Relating to the Type J Open Wire Carrier System, L. N. Inglefritz, R. N. Hunter, and A. L. Whitman, Bell Telephone Laboratories.

Some Application of the Type J Carrier System, L. C. Starbird and J. D. Mathis, Southwestern Bell Telephone Company, Dallas.

(15 minute recess at 10:30 A. M.)

Presiding: Louis P. Thein, St. Mary's University and Marvin Thrasher, Texas Power and Light Co.

Carrier Current Relaying, E. H. Bancker, General Electric Company, Schenectady.

Out of Step Blocking and Selective Tripping with Impedance Relays, H. R. Vaughan, Westinghouse Electric and Manufacturing Company, St. Louis, and E. C. Sawyer, Gulf States Utilities Company, Beaumont.

Tuesday, April 18, 9:00 A. M., Student Session

Presiding: J. M. Wilson, Rice Institute, and J. Y. Bowman, Southern Methodist University.

Papers from Student Branches of Rice Institute, University of Missouri, Missouri School of Mines and Metallurgy, University of Texas, and University of New Mexico.

Tuesday, April 18, 12:15 P. M.

Luncheon meeting with Houston Engineer's Club.

Tuesday, April 18, 1:30 P. M., Technical Session

Presiding: P. H. Robinson, Houston Lighting and Power Company and B. F. Meador.

Geophysical Prospecting, Dr. L. W. Blau, Humble Oil and Refining Company, Houston.

Electrical Equipment in Reflection Seismograph Prospecting, C. C. Nash and C. C. Palmer, Humble Oil and Refining Company, Houston.

Symposium: *Electricity in Pipe Line Corrosion.* Leader: J. C. Stirling, Stanolind Pipe Line Company, Tulsa. Contributors: R. A. Brannon, Humble Pipe Line Company, Houston; V. L. Nealy, Texas Pipe Line Company, Houston; W. H. Stewart, Sun Oil Company, Beaumont; David Harrell, Jr., Houston Pipe Line Company, Houston; and Earl Lipscomb, Western Union Telegraph Company, Dallas.

Tuesday, April 18, 7:00 P. M.

Dinner Dance, Main Ball Room, Rice Hotel.

Wednesday, April 19, 9:00 A. M., Technical Session

Presiding: A. L. Jones, Jr., General Electric Company, and V. O. Clements, Westinghouse Electric and Manufacturing Company.

Improvements in the Construction of Condenser Bushings, A. J. A. Peterson, Westinghouse Electric and Manufacturing Company, Pittsburgh.

An Electro Mechanical Analysis of Short Circuit Forces in Simple Bus Structures, E. W. Boehne, General Electric Company, Philadelphia.

A Survey of Contemporary Practice in the Application of Factory-Built Substations, Frank M. Starr, General Electric Company, Schenectady.

(15 minute recess at 10:30 A. M.)

Presiding: J. S. Porter, Westinghouse Electric and Manufacturing Company.

Mutual Inductance, Impedance, Power, and Symmetrical Components Expressed in Terms of Matrices,

(*Continued on page* 69)

PROMOTING SAFETY

Experience of Virginia Electric & Power Co. which placed first in the National Safety Council's 1938 utility contest indicates the value of complete, carefully-planned program.

By W. O. Randlett

Asst. Mgr., Insurance Dept.
Virginia Elec. & Pow. Co.

THE Virginia Electric and Power Company has been a competitor for the National Safety Council's annual award for eight years, and steady improvement has been made in its standing from 9th place in 1930-31 with a frequency of 9.5 accidents per million manhours worked to the winning frequency of 2.397 in the 1937-38 contest. The Company received certificates for finishing second for the two previous years, and a certificate for placing third in the 1934-35 contest.

The winning of this award was the fulfillment of a cherished ambition of the leaders of safety in the organization, and the accomplishment was a fitting climax to a safety program which has proven highly successful over the Company's extensive system in Tidewater Virginia and Northeastern North Carolina.

The Company first began an organized safety program in January, 1930, and by July of that year the work had extended to include all departments except Transportation (Bus and Car Operators). The personnel of the Safety Department is limited to one Safety Engineer in the Richmond and Carolina Divisions, and one Safety Engineer in the Norfolk Division.

Department's Objective

The objective of the Safety Department was to build up a program by selling the personnel on safety and creating interest in this manner rather than by a rigid plan of enforcement. The Safety Engineers' responsibility is one of close coordination with the entire personnel from the janitor to the highest executive. His job is principally one of salesmanship, in which he promotes and sells new ideas to the organization as a whole, remembering that the program must be acceptable to all in order to be successful. The Safety program, however, includes the following:

System Safety Council

The principal duties of this council are to discuss and take such action as may be necessary in the interest of safety as it affects the system personnel. It also acts as a clearing house for safety problems between the personnel and management. This council is composed of the two Safety Engineers and the System Insurance Supervisor. The Supervisor of Automotive Equipment, System Distribution Engineer, and the Superintendent of System Electric Operation are advisory members of the council.

Several of the large departments and districts have their own safety councils. The membership ranges from 3 to 14 members. The members are usually elected by popular vote of the department or district personnel annually. Each council appoints its Chairman and Secretary. The Safety Engineer attends these meetings whenever possible, and acts in an advisory capacity only. The councils meet monthly to discuss accidents that have occurred, after which the accidents are classified either as A—Not responsible; B—Partly responsible; or C—Responsible. They also take up and discuss other matters pertaining to safety and make recommendations for the consideration of the Safety Engineer or System or System Safety Council.

Education and Meetings

Safety meetings are held periodically in all departments and districts by departmental or crew supervisors with their respective personnel. Report forms are furnished by the Safety Department to cover the activities of these meetings, after which each report is studied carefully by the Safety Department to ascertain improvements that may be made in the general Safety program, as well as to note existing hazardous conditions discussed at these meetings.

Drills Conducted

Periodic meetings are held in all departments and districts by the Safety Engineers, bearing on a selection from such subjects as: General Safety, Safety Manual Review, Artificial Respiration, Safe Practices, Automotive Safety, Fire Drills, and First-Aid. Drills are also conducted in artificial respiration, first-aid and fire extinguishment. In addition, frequent use is made of silent and sound motion picture equipment as a special feature of such meetings.

Bulletin boards are maintained in all departments for the purpose of displaying posters obtained from various national and local safety organizations. The boards are also used to carry other safety instructions and literature as may be necessary from time to time.

Safety Instructions Prepared With Greatest Care

The Company's "Manual for the Safety of Employees" is compiled in sections so that an employee will have instructions pertaining to his phase of work only. It was not considered necessary that an employee of the Transportation, Mechanical, Gas, Ice, or Maintenance of Way Department should be required to study and learn instructions that were prepared specifically for the Electric Department, etc.

Much time was spent in the preparation of the Safety Manual,

and employees in all departments were afforded an opportunity to participate in assembling material for the book. Care was exercised to omit the printing of any instructions that could not be reasonably enforced, since it was felt that one printed instruction of this nature would spoil the effectiveness of the entire manual. The purpose was to avoid any feeling on the part of employees that the manual was designed only to protect the Company in case of an accident and not intended to assist the men in their work. The term *"RULES"* is never used in referring to the Company's safety program since the word causes resentment on the part of employees. Whereas they accept *"INSTRUCTIONS"* as being educational and beneficial. Every effort is made by the Safety Department to impress upon the men that the safety manual is designed for their protection and the Company is primarily interested only to that extent. This is accomplished by holding group meetings where the contents of the manual are read by the group leader and explained word for word, after which the men are invited to ask questions on instructions which may not be clear, or to offer suggestions where certain instructions may seem objectionable. This practice is particularly necessary as respects new employees.

First-Aid

During the early stages of safety work in the Company the need for education of employees in first aid to the injured was apparent. In view of the scattered operations of the Company over parts of two states, medical attention could not readily be obtained within a reasonable time in all cases. In carrying out this phase of education the first-aid course of the American Red Cross was adopted, with the Safety Engineers and other selected employees taking special instructors' course in order to be eligible to teach first-aid in the Company under the auspices of the American Red Cross. At present approximately 80 per cent of the personnel in the Electric and Gas Departments have completed the standard first-aid course. The results of such training have been very gratifying, and these employees have not only rendered valuable treatment to their fellow workers in preventing serious results from injuries received but have in many cases given timely assistance to non-employees on the streets, highways, and in the home, many of whom were customers or patrons. Recently one of the employees successfully administered artificial respiration to a person who had been suffocated by immersion in water for approximately twenty minutes. Also, a line crew rendered first-aid to seven victims of an automobile accident on a highway near Richmond.

Infections Eliminated

As an example of the effectiveness of the first-aid training, since 1930 the workers in this organization have been successful in reviving nine fellow employees from electric shock through artificial respiration. There has not been a single case of infection since 1931 where the injured was given prompt first-aid treatment. It is also interesting to note that there has not been a lost-time accident on the system resulting from infection since 1931.

Standard first-aid kits are carried on all motor vehicles, and are placed conveniently in all buildings and plants.

The Shaefer or Prone Pressure method of artificial respiration is taught and practiced in the Company. To stimulate interest in the first-aid and artificial respiration program annual contests between teams and individuals representing the various districts are held. These contests are under direction of officials of the American Red Cross, and suitable trophies are awarded to those exhibiting the best performance. Practice drills and lectures are given by the Safety Engineers at least once every three months.

Health

The Company endeavors to edueducate its employees to learn the value of good health and habits, and does everything possible in assisting them to protect and maintain their health. This is partly accomplished through an Employees' Benefit Association which provides medical attention, X-rays, special examinations, prescribed medicines, and hospitalization. The association also furnishes sick, accident, and death benefits, all at a nominal monthly cost, which is handled through pay roll deductions.

When it is noticed that an employee is not in the best physical condition he is advised to consult one of the association doctors, and is not allowed to return to work until he has obtained a release from the physician. This also applies to the employees who report for work after several days of absence due to sickness or physical defects and have not consulted an association doctor.

Occasional health lectures are given at group meetings, and health bulletins are posted periodically. The personnel in the operating departments are encouraged to take typhoid serum every three years, which service is made available through the Benefit Association.

When it is found that an employee has some physical defect of a questionable nature, which would make him unsafe or unsatisfactory on his present job, he is transferred to a more suitable job or location. Occasionally, in extreme cases, it has been necessary to remove such employees from all duties and pension them.

All white employees are given a

Accidents have been steadily reduced by the Virginia Electric & Power Company.

medical examination at the time of employment, and follow-up examinations are given when it is considered necessary. The Safety Department gives personal eye examinations every two years, using a Keystone Telibinocular Unit for such tests.

This activity was first started in 1934, and to date approximately 1800 tests have been completed in the Electric and Gas Departments. The results have proved valuable, both to the personnel and the Company, since the percentage of eye defects found was high. In several cases it was found that the employee was blind, or practically blind, in one eye, or vision was such that correction did not help, and in such cases the employees were not permitted to continue as drivers of vehicles or to fill jobs where good vision was essential.

Job Requirements

No employee is assigned to a job of a hazardous nature, or where inefficiency on his part would impair the safety of others, until his supervisor is satisfied he is capable of executing the work to be assigned.

In 1936 the practice of giving driving examinations to new employees whose work required them to drive Company vehicles was adopted. In addition to the eye test already mentioned, this examination consists of a written test containing forty questions, a hearing test, and a practical driving test on the streets or highways.

Plans are now in progress whereby these tests will be given to all employees regardless of length of service. Similar examinations are also being planned and designed for all operating jobs, since it is felt this is essential in the best interests of a safety program.

Inspections

Periodic inspections are made of all equipment and property by departmental supervisors. Forms are furnished by the Safety Department for these inspections and when completed the forms are noted by the Superintendent and District Manager, and then forwarded to the Safety Department. These forms include space to show how and when the defects were corrected, and also provides for any recommendations that might be suggested.

The Safety Department personally makes periodic inspections of all automotive equipment, buildings, power plants, substations, car barns, garages, pole yards, pole top switches, ladders, winches, derricks, lockers, and hand tools. Defects noted are reported to the supervisor in charge. Such defects are usually corrected immediately by the Supervisor in charge, but if this is not possible they are referred to the Superintendent or District Manager.

A report of these inspections is made to the management only in cases where it is absolutely necessary in order to obtain the desired results.

Automotive equipment is inspected by the Mechanical Department on a 2000 mile basis, and official inspections in compliance with state regulations are made in May and October of each year. The official state inspections are carried out under the supervision of the Safety Department.

Protective Equipment

The Safety Department approves the purchase of all protective equipment, first-aid equipment, medical supplies, tools and other equipment where the factor of safety is of prime importance. Since early 1937 the Safety Department has assumed responsibility of handling, testing, and distributing all rubber protective equipment, such as rubber gloves, line hose, sleeves, hoods, blankets, jackets, shoes, and rubber glove protectors. This equipment is returned to the testing laboratory periodically from the field and the schedule maintained is thirty days for rubber gloves and ninety days for all other rubber protective equipment.

The procedure for handling this equipment in the laboratory is as follows: The equipment is cleaned and sterilized by a washing process, after which it is inspected visually for cuts and mechanical injuries. Gloves and shoes are tested at 10,000 volts, and all other equipment at 15,000 volts. A separate record is maintained for each item and identified by a Company serial number. This record shows date of purchase, cost, type, make, from whom purchased, date of each test, results of test, name of tester, date of assignment, name of assignee, date discarded, and reason. Prior to the time the work was taken over by the Safety Department the testing was done by the various districts. However, they did not use process of cleaning and sterilizing, nor did they maintain such accurate and complete records.

Incentives and Awards

In order to obtain the desired results in the safety program it was considered essential that the interest of the entire personnel be created and maintained. It was found that the best method to accomplish this was the promotion of friendly contests between various departments and districts. A contest is maintained between the Richmond, Carolina, and Norfolk Divisions, Electric and Gas Departments, and the results shown by monthly posted bulletins. In the Electric Departments, Richmond and Carolina Divisions, a departmental contest is promoted annually, the reward being possession of the Vice-President's Cup. This silver cup is presented to the district having the best safety record at the end of each fiscal year, with the understanding that the district winning the cup three years obtains permanent possession.

It has also been the practice to recognize outstanding "no lost time" accident records made by departments and districts, which recognition is usually acknowledged in the form of a dinner, picnic, or similar celebration.

At the end of each year all employees in the operating departments who have worked throughout the entire fiscal year without an accident of any nature (except in cases of minor injuries not requiring a doctor's attention) are awarded a Company Safety Certificate.

The Company holds memberships in various local, sectional, and national safety council organizations, and participates in contests sponsored by these organizations. In addition to the distinction of winning the National Safety Council Contest in 1937-38, the Company was also winner of the annual contest conducted by the Southeastern Electric Exchange in 1937 for the best lost-time accident record, and notice has just been received that it was again winner in this group for the year 1938.

NEWS of the INDUSTRY

Dealers

Georgia Dealers Hear Educational Program

A dramatization of the advantages of modern electric cookery and water heating was presented in March to appliance dealers throughout the Georgia Power Company's territory in an educational program emphasizing the fundamentals of successful salesmanship.

Designated as the "Electrical Cavalcade," the program represented one of the first large scale cooperative programs ever undertaken by electric appliance distributors of Georgia. Ten electric range and water heater distributors participated in the program in cooperation with the Georgia Power Co.

Between March 3 and March 16, the program was presented in nine Georgia cities. All meetings were well attended by appliance dealers and their salesmen, with more than a hundred in attendance at some of the meetings.

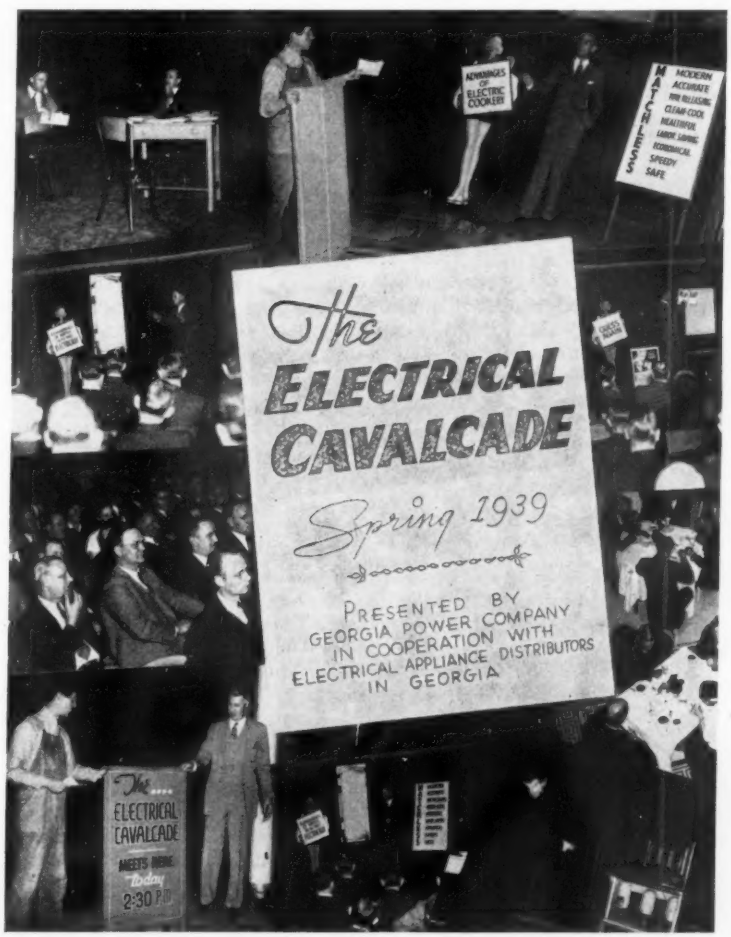
The program included talks, skits and dramatizations on the following subjects: Georgia Power Company merchandising policies of 1939; advantages of electric cookery; cost of operating an electric range with references to the Modern Kitchen Bureau's "Guess Again" campaign; the relative advantages of the CP gas range and a modern electric range; how to use the kitchen planning story as a highly profitable selling tool; the availability of kitchen planning assistance; advantages of electric water heating; and how the appliance dealer can get best results from his store and salesmen.

H. A. Smeeton, dealer coordinator for Georgia Power Company, introduced the program at the various meetings. He was followed by Harry Giles, Graybar Electric Company, who served as master of ceremonies. Others who participated in the skits and presentations were: C. A. Wallis, Westinghouse Electric & Manufacturing Co.; Guy Lynes, kitchen planning engineer, Georgia Power Co.; James Crew, General Electric Co.; M. O. Mosteller, Peaslee-Gaulbert Co.; Bill Nagel, Edison General Electric Appliance Corp.; T. B. Willard, Edison General Electric Appliance Corp.; Howard Peacock, General Electric Supply Co.; Ed Bruce, Commercial Credit Co.; and Jerry Neislar, Hopkins Equipment Co.; all of Atlanta.

Among the appliance distributors participating in the series of presentations were W. D. Alexander Co., Beck & Gregg Hardware Co., Electric Sales & Service Co., Frigidaire Corp., General Electric Supply Corp., Graybar Electric Co., Hopkins Equipment Co., Lamar-Rankin Co., Peaslee-Gaulbert Co., and Westinghouse Electric Supply Co.

Appliance Sales Rise Sharply in 1939

A sharp rise in the sales of electrical appliances in 1939 is evident from reports for the month of January. In three classifications the rise ranged from 43 to 96 per cent over the same month a year ago and in two of the class-


The ELECTRICAL CAVALCADE
Spring 1939
PRESENTED BY GEORGIA POWER COMPANY IN COOPERATION WITH ELECTRICAL APPLIANCE DISTRIBUTORS IN GEORGIA
ADVANTAGES OF ELECTRIC COOKERY
MODERN ACCURATE FIRE KILLING CLEAN COOL HEALTHFUL LABOR SAVING ECONOMICAL SPEEDY SAFE
The ELECTRICAL CAVALCADE MEETS HERE Today 2:30 P.M.

Scenes from the "Electrical Cavalcade," an educational program for appliance dealers presented by a number of Georgia distributors in cooperation with the Georgia Power Co.

ifications sales were above those for January 1937.

Electric refrigerator sales to wholesalers and dealers amounted to 140,053 units, a rise of 43 percent over the 97,641 units sold in January 1938. This, however, is less than the 158,417 units of January 1937.

The sales of electric ranges increased from 18,500 in January 1938 to 28,074 or 52 percent, and were 7.3 percent over the 26,160 of January 1937.

The sharpest gain was in electric water heaters. Volume was 5,111, an increase of 96 percent over the same month's sales of 2,617 in 1938 and 51 percent ahead of January 1937 when 3,372 units were sold.

* * *

Factory shipments of household washers in February attained the greatest one-month total since September, 1937, aggregating 129,885. This is an increase of 37.10 percent over the shipments of 94,734 washers reported for February, 1938, according to industry figures reported today to Joseph R. Bohnen, executive secretary-treasurer of the American Washer and Ironer Manufacturers' Association.

"Shipments in February, a short month, also were 18.17 percent greater than in January, 1939, which in turn showed 62.81 percent increase over the industry total of 67,502 reported for December, 1938," Mr. Bohnen said. "The two-month total of 239,794 washers is 43.29 percent greater than the shipments in the corresponding months of 1938."

Household ironers shipped in February were 8,016, compared to 10,823 in February, 1938, and to 8,208 in January, 1939.

Dealer Sales are Large Percentage of Total

The remarkable progress in sales by the associated electrical dealers of the Carolina Power and Light Company, which maintains headquarters in Raleigh, North Carolina, is shown in the company's February issue of the *Dealer Coordinator.*

Dealer sales of electrical ranges during the year 1938 amounted to 2,456 units representing 71% of the total number of ranges sold. In comparison, dealer sales of ranges in 1935 amounted to only 7% of the total.

Dealer water heaters sold in 1938 amounted to 770 units or 65% of the total number sold. Water heaters sold by dealers in 1935 amounted to only 4% of the total.

Dealers accounted for 9,023 refrigerator sales in 1938 representing 94% of the total number sold in the territory served by the Carolina Power and Light Company. Dealer refrigerator sales in 1935 represented only 59% of the total.

Lamps Head List of 1938 Florida Appliance Sales

Tabulated figures from the Florida Power & Light Company, Miami, giving the results of dealer sales in appliances of all kinds for the year 1938 show a total of 108,053 unit sales. Although the sales saturation of electric refrigeration for this area has reached a high percentage, there was a total of 11,215 refrigerators sold. Floor and table lamps headed the list, with a total of 28,097 units. Radios were second in number, showing a total of 13,233.

In table appliances toasters led with 7,393. Percolators and coffee makers were second with a sales total of 6,410 and irons were third on the list with 5,967 being sold. A total of 22,537 table cookery units were sold.

Attic fans and air conditioning units amounted to 113; ranges 2,529 and water heaters 1,339.

Dishwashers continue to be a slow selling item, only 23 appearing on the list. Washing machines are picking up. Laundry equipment, including washers and ironers, amounted to 3,119.

TVA Customers Purchase $2,000,000 in Appliances

Residential consumers using TVA power purchased more than $2,000,000 worth of electrical appliances during the calendar year 1938, according to reports made by more than 400 private appliance dealers to the Tennessee Valley Authority.

The total sales of $2,098,500 reported for the year compared to $1,820,500 in 1937 and $1,033,800 in 1936, John B. Blandford, Jr., general manager of the Authority said.

Average sales per customer for 1938, based on the weighted average number of customers connected each month, were $46.71. The total number of residential customers, exslusive of those on Government reservations, at the end of 1938 was 77,200 compared to 30,200 at the end of 1937.

Appliances purchased and put into use by TVA residential power consumers included 4,701 electric refrigerators, 2,449 electric ranges 814 water heaters, 597 water pumps, 921 residential electric heaters, 2,654 electric washing machines, 77 ironers and 26,936 miscellaneous appliances.

Bargain Hose Develops Store Traffic

Silk hose and electrical appliances make strange bedfellows, but A. J. Kamons, of the Parkersburg Norge Company of Parkersburg, West Virginia, is combining the two lines profitably. A substantial stock of good quality silk hose has been put in by the appliance dealer, attractively displayed in his store, and advertised extensively at sale prices. "Good hose at a bargain is one attraction that will always interest women," stated Mr. Kamons, "and the traffic thus produced is an excellent means of lining up prospects for appliance sales."

Dealers View New Lines

Frigidaire dealers and salesmen from all over South Carolina attended the annual statewide sales meeting of the Frigidaire Company at Hotel Columbia, South Carolina, recently. A morning session was devoted to demonstrations of the company's refrigerator and a sound motion picture demonstrating a new refrigerator principle. Afternoon sessions included discussions of ranges and water heaters.

R. A. Snook of Columbia, state representative, and Guy Cheney, of the Atlanta office, were in charge of the meeting.

* * *

More than sixty dealers in Norge electric ranges and refrigerators met at the Colonial Village near Fayetteville, N. C., in March, to see 1939 models of the Norge line and to hear Art Kitson, factory representative of the Norge Company, explain their features.

Details of the meeting were arranged by M. M. Smith of the Quinn-Miller Company, Fayetteville Norge dealers.

C. E. Beeson, vice-president of the Southern Bearings and Parts Company, of Charlotte, and George Fullenwider, Norge sales manager, also of Charlotte, attended.

* * *

An enthusiastic crowd of nearly 100 dealers attended a meeting conducted by the Interstate Electric Company in cooperation with the Crosley Radio Company in Mobile, Alabama, early in March.

The meeting provided dealers with an opportunity of seeing 1939 models of Crosley refrigerators and radios. Much interest was shown in the famous "Reado" facsimile machine recently introduced by Crosley which prints radio broadcasts in newspaper style.

The meeting was in charge of Warren Unsworth, district manager for Interstate. Speakers, besides Mr. Unsworth, were: O. G. H. Rasch, secretary-treasurer, and Dan Mouledous, sales manager, both of Interstate Electric Company. George Lasley, district representative for Crosley, also addressed the dealer group.

New Firms, New Stores and New Lines —

Carl Nelson Appliance Company has just opened for business in Milledgeville, Ga. The Hotpoint line of home appliances will be carried in stock. Owner of the new firm is Carl Nelson, formerly associated with the Georgia Power Company in Macon and Jonesboro.

* * *

Alton B. Watts announces the opening of the Electric Service Shop in Canton, N. C. The new firm will offer radio and appliance service and in addition will carry an assortment of lighting fixtures and electrical appliance parts.

* * *

McKeown Freeman, Inc., is the name of the new firm recently opening for business in Greenville, S. C. General Electric home appliances will be carried as well as G-E oil burning furnaces, attic ventilating fans and air conditioning units.

S. M. Pierson is manager of the new firm. He has been identified with the General Electric line for ten years.

* * *

O. B. Lancaster, of Sumner, Miss., has just opened the Lancaster Appliance Company. The new appliance firm will handle Frigidaire home appliances and R.C.A. radios.

* * *

E. S. Butler and R. D. Franklin, electrical contractors of Eastman, Ga., have added a retail electric appliance store to their business. Mr. Butler announces that the appliance division will handle a full line of General Electric home appliances and also a line of electrical water systems.

* * *

The Furrow Electric Company, of Bristol, Virginia, has obtained a local dealership on the full line of Kelvinator appliances. The Furrow Electric Company has been in the electrical appliance business in Bristol for more than 18 years and is one of the oldest electrical firms in this vicinity.

* * *

The Glass Radio Company, of Chatham, Virginia, was recently appointed dealer for Frigidaire electric refrigerators for Chatham and surrounding territory. H. O. Glass, owner of the firm, has been established in his present location for the past ten years.

* * *

The Live Wire Electric Company, of Goldsboro, N. C., has just remodeled and greatly enlarged its place of business. Lawrence McIntyre, proprietor, announced that the firm now has the local dealership for General Electric home appliances and plans to carry one of the most complete lines in the community.

* * *

The El Paso Radio Equipment Company opened in El Paso recently under the management of Anthony A. Thomas, formerly a radio engineer with the army. Commercial and broadcast type radio receivers will be sold. The service department will handle short wave receivers and transmitters and also the ordinary type broadcast receiver.

The sales department is mapping out an extensive program of advertising that will import to El Paso for the first time 2000 foot-candle power daylight window illumination, changing colors in night illumination, and moving designs.

The showroom is furnished to accommodate customers who desire to shop at leisure rather than a large volume of casual customers.

Utilities

Sales Executives Meet in Chicago

Commercial managers of electric utility companies from all parts of the United States met at Chicago during the week of March 20th for the Sixth Annual Sales Conference of Edison Electric Institute. The conference was devoted to a discussion of sales practices and problems.

Harris E. Dexter, of Central Hudson Gas & Electric Corporation, Poughkeepsie, N. Y., chairman of the General Sales Committee of the Institute, was general chairman of the Conference.

Emphasis of the conference was largely on problems of improving standards of living in the home by encouraging greater household use of electricity.

The opening session, Tuesday, March 21st, was devoted to a general discussion of utility sales problems. The afternoon program presented the activities of the Better Light—Better Sight movement, with C. A. Eastman, chairman of the National Better Light—Better Sight Bureau, presiding.

On Wednesday, March 22nd, other aspects of the home market were considered. George E. Whit-

An electric roaster was given a prominent place in the display booth of the Georgia Power Company at the House of Progress Exposition held in Atlanta recently. Mrs. Eva Clayton demonstrated the roaster for the thousands of persons attending the show. The Georgia Power Company also displayed an all-electric kitchen in the model home constructed on the stage of the auditorium in which the Exposition was held. The kitchen was planned by Guy Lynes and contained range, refrigerator, water heater, dishwasher, sink and a useful array of small appliances.

well, chairman of The Modern Kitchen Bureau, presided at the afternoon session, at which the Bureau's 1939 programs were discussed. B. F. Weadock, vice president and managing director of Edison Electric Institute, was the speaker at a formal luncheon on Wednesday.

The program on Thursday, March 23rd, included discussions on advertising, air conditioning in relation to health, and wiring problems.

Sales Plan to Emphasize Small Appliances

A merchandise sales quota of $2,000,000 for 1939 has been announced by the Georgia Power Company. This quota includes all divisions of the company and covers both major and small appliances.

Particular emphasis will be placed on the sale of small appliances during the ensuing year. To help increase the volume of small appliance sales during 1939, a store special of the month for every month from February on will be featured. The particular appliance will not only be the special of the month to company sales people but will be promoted to the public as a special for a limited time only. For example, the February store special was a de luxe coffee-maker set. Leaflets and displays featuring this special were sent to all stores and newspaper advertising featuring it was released throughout the month.

R. K. Lane Named President Of Oklahoma Utility

R. K. Lane, of Tulsa, has been elected president of the Public Service Company of Oklahoma and the Southwestern Light and Power Company, succeeding Fred W. Insull, who died in January. Mr. Lane had been vice president of the Public Service Company since 1928.

Display Box Demonstrates Value of Adequate Wiring

A permanent display box, designed and built by the Consolidated Gas Electric Light and Power Company of Baltimore, was a feature of that utility's adequate wiring exhibit at the recent Electrical Manufacturers Representatives Association exhibition.

Carrying the heading "See the Difference between Inadequate and Adequate Electrical Wiring," this display enabled visitors to get a graphic picture of the advantages of adequate wiring in the home through the use of switches, transparencies of six electrical appliances, a watt-meter panel and a fuse panel.

J. Carl Fisher, illuminating engineer of the utility, states that it may be used in some of the adequately wired demonstration homes so that visitors may have their attention more forcibly called to the wiring system and its importance with special emphasis on adequate copper.

New President Elected for Central Power & Light Co.

Lon C. Hill, former Lower Rio Grande Valley citizen, was elected president of Central Power and Light Company at a meeting of the board of directors in Corpus Christi March 15, succeeding James C. Kennedy, who is retiring from the president's position at his own request. Mr. Kennedy will continue to serve on the board of directors and will be available to the company in an advisory capacity. He will maintain his residence in Corpus Christi.

The new president is the son of the late Lon C. Hill, Sr., widely known Valley pioneer, who established the town of Harlingen. He attended the University of Texas and engaged in land development in the Valley until 1925, when he entered the investment banking business. Since 1932, Mr. Hill has been occupied with the operation of citrus groves and other Texas properties.

El Paso Sales Executive Transferred to Baton Rouge

Appointment of E. A. Werner as merchandise sales manager of the Baton Rouge Division was announced recently by the Gulf States Utilities Company. Although Mr. Werner is a native of Boston, he has been located in El Paso with the El Paso Electric Company for the past five years.

Mr. Werner succeeds P. P. Newman who has been made superintendent of sales in Port Arthur, Texas. Mr. Newman has been associated with the Gulf States Utilities Company and its predecessor for 15 years having started as a salesman following his graduation from the Louisiana State University.

Home Building Campaign Spurred by Utility

The Monongahela West Penn Power Company, operating in West Virginia and Ohio, is engaged in a campaign to spur federally aided home building. E. E. McWhorter, of the Fairmont, West Virginia, offices of the company, is conducting the drive.

The company is working with builders, contractors, supply dealers and labor unions in approaching the many problems attendant to the construction of new homes and the modernization of old homes. Free wiring layouts and lighting plans are being made available to all builders of new homes.

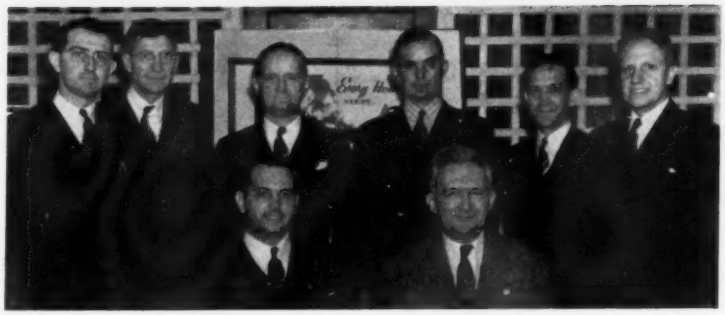
FHA literature is distributed in all of the company's stores and other mediums of publicity are being used such as newspaper advertising, addresses before club meetings, etc. Typical of this general literature distribution is the use of thousands of copies of the 1938-39 Small Home Builders Yearbook, containing many individual home plans, and suggestions on every phase of constructing and furnishing new homes.

Gallatin Properties Sold By Ky.-Tenn. Pow. & Lt. Co.

The Kentucky-Tennessee Power and Light Company had virtually withdrawn from Tennessee with the sale of its properties in Gallatin to the city at a price of $150,000. The sale, completed recently, left only a few small communities on the state line within the company's field of operations.

Lighting Meeting Planned For Oklahoma City

The Southwestern Section, Illuminating Engineering Society, is planning an interesting program for a meeting to be held in Okla-



At a recent meeting of the Charlotte Adequate Wiring Bureau an ambitious program was worked out for spring months when building in Charlotte is expected to be at a peak. Shown here are members of the Bureau. Seated: George E. Wilkinson, chairman, Mill Power Supply Company (left), and A. E. Schanuel, field representative, National Adequate Wiring Bureau. Standing, left to right, E. V. Sapp, treasurer, Economy Electric Company; Roy Robinson, vice chairman, Robinson Electric Company; C. B. Miller, Jr., chairman publicity, Duke Power Company; Norman E. Tindal, secretary, Duke Power Company; Paul T. Tysinger, lighting supervisor, Duke Power Company; and Roy A. Palmer, illuminating engineer, Duke Power Company.

homa City, Oklahoma, April 28 and 29. A feature of the meeting will be a residence lighting forum which will include discussions by lighting specialists from various companies in the Southwest.

D. W. Atwater, national president of IES, is expected to be present to address the meeting.

Charleston League Elects New Officers for 1939

New officers elected for 1939 by the Electric League of Charleston, West Virginia, include the following: president, E. L. Murray, The Diamond Department Store; vice president, C. R. Stouch, General Electric Company; and secretary-treasurer, J. M. Mathews, Appalachian Electric Power Company.

The League has scheduled a series of dinner meetings for the first Thursday of each month and looks forward to an active year. A. E. Schanuel, of the National Adequate Wiring Bureau, and G. W. Keller, of the Modern Kitchen Bureau, were both recent visitors and addressed the League on their respective programs.

Norfolk Wiring Bureau to Apply for Certification

The Norfolk Adequate Wiring Bureau, which sponsored a meeting on March 10 addressed by A. C. Tait, is now planning to apply to the National Bureau for a license to operate the certification plan. W. P. Neblett is president of this group, with L. E. Burford, vice-president, and Albion E. Dunn, secretary-treasurer. Mr. Tait was introduced by Mayor John A. Durkin, who extended a welcome as mayor and later addressed the meeting as an electrical contractor.

Contractors

Contractors Appoint New Field Representative

Leon Kite, of Charlotte, N. C., was recently appointed field representative for the North Carolina Association of Electrical Contractors. He succeeds C. S. Boger who is now a full time field engineer for the N. C. Board of Examiners of Electrical Contractors. Although a native of Illinois, Mr. Kite has resided in the Southeast for a number of years. For the past five years he has made his home in Charlotte and has been occupied with the teaching of woodwork, radio and electricity courses. Before coming to Charlotte, he taught industrial arts in Arcadia, Florida, for four years.

The North Carolina Association of Electrical Contractors is starting the year with three main objectives, Mr. Kite reports. These include a fair sales distribution plan for materials with a definite differential based on quantity purchases; a higher standard of business methods including adequate and accurate records of jobs and sound methods of estimating; and a better and more cordial relation between electrical contractors, wholesalers, utilities, and inspectors.

A promotions committee was appointed at the last meeting of the Association's board of directors. Ralph Bouligny will head the committee as chairman; other members include Ralph Robinson, Harry Clegg, Marion Haynes, E. C. Peele, E. R. Edman, and Raymond Starr. This committee will meet with a wholesalers' committee to discuss a working plan of fair sales distribution. The committee of electrical wholesalers is composed of Jim Campbell, Hugh Dellinger, R. M. Johanneson, B. Merritt and Y. P. King.

The Association now has a membership totaling 120.

Line Construction Contracts Awarded

Construction Reports No. 41 and 42 of the Rural Electrification Administration announce approval on the following construction contracts, covering rural lines in southern states:

Alabama

The Pea River Electric Membership Corp., Clayton Alabama, has awarded a contract to Harvey & Quina, Pensacola, Florida, for building the first section of the project, consisting of 194 miles of line to serve 385 members. The successful bid was $102,998.

The Southern Pine Electric Membership Corp., Brewton, Alabama, has awarded a contract to Harvey & Quina, Pensacola, Florida, for building the entire project, consisting of 274 miles of line to serve 600 members. The successful bid was $135,761.

The Baldwin County Electric Membership Corp., Robertsdale, Alabama, has awarded a contract to the Rogers Electric Co., Birmingham, Ala., for building another section of the project, consisting of 78 miles of line to serve 276 members. The successful bid was $43,603.

The Butler County Electric Membership Corp., Greenville, Alabama, has awarded a contract to the Smith Engineering and Construction Co., Pensacola, Florida, for building another section of the project, consisting of 85 miles of line to serve 180 members. The successful bid was $41,310.

The South Alabama Electric Membership Corp., Troy, Alabama, has awarded a contract to W. L. Coston and Sons, Bessemer, Alabama, for building another section of the project, consisting of 265 miles of line to serve 650 members. The successful bid was $142,553.

The Pea River Electric Membership Corp., Clayton, Ala., has awarded a contract to Richards Brothers, Carrollton, Georgia, for building the second section of the project, consisting of 194 miles of line to serve 406 members. The successful bid was $107,183.

Arkansas

The Ozark Rural Electric Cooperative Corp Fayetteville, Arkansas, has awarded a contract to Fritz Ziebarth, Long Beach, California, for building the first section of the project, consisting of 291 miles of line to serve 700 members. The successful bid was $188,274.

Georgia

The Troup County Rural Electrification Corp., LaGrange, Georgia, has awarded a contract to the Universal Electric Construction Co., Guntersville, Alabama, for building another section of the project, consisting of 152 miles of line to serve 400 members. The successful bid was $80,672.

The Douglas County Electric Membership Corp., Douglasville, Georgia, has awarded a contract to the Dixie Electric Co., Atlanta, for building another section of the project, consisting of 177 miles of line to serve 626 members. The successful bid was $95,266.

The Forsyth County Rural Electric Association, Cumming, Georgia, has awarded a contract to the Alrich Electric Construction Co., Augusta, Georgia, for building the first section of the project, consisting of 155 miles of line to serve 566 members. The successful bid was $88,573.

The Habersham Electric Membership Corp., Clarkesville, Georgia, has awarded a contract to Gibson Brothers, Enterprise, Alabama, for building the entire project, consisting of 185 miles of line to serve 574 members. The successful bid was $111,970.

The Jackson Electric Membership Corp., Jefferson, Georgia, has awarded a contract to W. A. Mathis, Athens, Georgia, for building the second section of the project, consisting of 220 miles of line to serve 1,157 members. The successful bid was $143,309.

The Colquitt County Rural Electric Co., Moultrie, Ga., has awarded contracts for building two additional sections of the project, one to the Coffee Construction Company, Eastman, Georgia, consisting of 112 miles of line to serve 364 members (the successful bid was $69,287); the other to the Bigby Electric Company, Tampa, Florida, consisting of 142 miles of line to serve 426 members. The successful bid was $72,285.

The Upson County Electric Membership Corp., Thomaston, Ga., has awarded a contract to R. A. Bowen, Macon Georgia for building another section of the project, consisting of 99 miles of line to serve 345 members. The successful bid was $56,819.

Kentucky

The Salt River Rural Electric Cooperative Corp., Bardstown, Kentucky, has awarded a contract to the Henry Bickel Company, Louisville, for building the third and fourth sections of the project, consisting of 242 miles of line to serve 800 members. The successful bid was $163,896.

The Warren Rural Electric Cooperative Corp., Bowling Green, Kentucky, has awarded a contract to the Killoren Electric Co., Appleton, Wisconsin, for building the second section of the project, consisting of 168 miles of line to serve 447 members. The successful bid was $113,159.

The Nolin Rural Electric Cooperative Corp., Elizabethtown, Kentucky, has awarded a contract to the R. H. Bouligny Co., Charlotte, North Carolina, for building the first section of the project, consisting of 290 miles of line to serve 812 members. The successful bid was $193,774.

The West Kentucky Rural Electric Cooperative, Mayfield, Kentucky, has awarded a contract to R. H. Bouligny Inc., Charlotte, North Carolina, for building the entire project, consisting of 203 miles of line to serve 548 members. The successful bid was $126,289.

Mississippi

The Capital Electric Power Association, Jackson, Mississippi, has awarded a contract to John Oman, Jr., Nashville, Tennessee, for building another section of the project, consisting of 50 miles of line. The successful bid was $42,506.

The Southern Pine Electric Power Association, Taylorsville, Mississippi, has awarded a contract to W. L. Costen and Sons, Bessemer, Alabama, for building another section of the project, consisting of 401 miles of line to serve 1,086 members. The successful bid was $216,765.

North Carolina

The Anson Mutual Electric Corporation Wadesboro, N. C., has awarded a contract to Day and Zimmerman, Philadelphia, Pa., for building the first section of the project, consisting of 305 miles of line to serve 890 members. The successful bid was $180,295.

The Randolph Electric Membership Corp., Asheboro, N. C., has awarded a contract to the Perkins-Barnes Construction Co., Blackstone, Virginia, for building the project, consisting of 227 miles of line to serve 650 members. The successful bid was $166,857.

Oklahoma

The Oklahoma Inter-County Electric Cooperative, Norman, Oklahoma, has awarded a contract to A. G. Ainsworth, Dallas, Texas, for building another section of the project, consisting of 100 miles of line to serve 212 members. The successful bid was $63,853.

The Red River Valley Rural Electric Company, Marietta, Oklahoma, has awarded a contract to the B and M Construction Corp., Oklahoma City, Okla., for building another section of the project, consisting of 22 miles of line to serve 78 members. The successful bid was $16,073.

The Southwest Rural Electric Cooperative, Tipton, Okla., has awarded a contract to the B and M Construction Corp., Oklahoma City, Okla., for building another section of the project, consisting of 160 miles of line to serve 350 members. The successful bid was $97,300.

Tennessee

The Cumberland Electric Membership Corp., Clarksville, Tennssee, has awarded a contract to John Oman, Jr., Nashville, Tennessee, for building the second section of the project, consisting of 450 miles of line to serve 1,500 members. The successful bid was $340,722.

Texas

The Hill County Electric Cooperative, Inc., Itasca, Texas, has awarded a contract to the A. G. Ainsworth Construction Co., Dallas, Texas, for building another section of the project, consisting of 144 miles of line to serve 320 members. The successful bid was $83,481.

The Grayson-Collin Electric Cooperative, Inc., Van Alstyne, Texas, has awarded a contract to the Mattison-Wallack Co., Britton, Oklahoma, for building another section of the propect, consisting of 159 miles of line to serve 506 members. The successful bid was $91,427.

The Lyntegar Electric Cooperative, Tahoka, Texas, has awarded a contract to Reinhart and Donovan, Oklahoma City, Oklahoma, for building the first and second sections of the project, consisting of 320 miles of line to serve 950 members. The successful bid was $196,470.

The Bailey County Electric Cooperative Association, Muleshoe, Texas, has awarded a contract to J. E. Morgan and Sons, Waco, for building the first section of the project, consisting of 249 miles of line to serve 550 members. The successful bid was $120,421.

The Wharton County Electric Cooperative, Inc., Danevang, Texas, has awarded a contract to the Uvalde Construction Co., Dallas, Texas, for building the entire project, consisting of 244 miles of line to serve 410 members. The successful bid was $117,330.

Virginia

The Southside Electric Co., Blackstone, Virginia, has awarded a contract to the Perkins-Barnes Construction Co., Blackstone, Virginia, for building another section of the project, consisting of 185 miles of line to serve 325 members. The successful bid was $148,421.

Cooperatives

REA Allotments for Lines and Wiring

Among the allotments announced by the Rural Electrification Administration in March for rural line construction in southern states were the following:

	Amount	No. Miles	Number Customers
Alabama:			
Black Warrior Elec. Mem. Corp.	$446,000	494	1,760
Central Alabama Elec. Mem. Corp.	384,000	459	1,701
Arkansas:			
Carroll Electric Coop. Corp.	$283,000	307	1,016
Craighead Elec. Coop. Corp.	365,000	405	1,296
Florida			
Sumter Electric Coop. Assn., Inc.	$138,000	173	550
Kentucky:			
Fleming-Mason Rural Elec. Coop. Corp.	$227,000	201	862
Louisiana:			
Louisiana Ice and Elec. Co., Inc.	$ 65,000	80	568
Mississippi:			
Tallahatchie Valley Elec. Power Assn.	$117,000	145	490
Pearl River Valley Elec. Power Assn.	91,000	101	375
North Carolina:			
Union Electric Membership Corp.	460,000	500	1,852
Oklahoma:			
Alfalfa County Elec. Coop., Inc.	$ 88,000	118	253
Rural Electric Co.	98,000	97	324
Harmon Electric Coop., Inc.	233,000	250	731
Northfork Power Co.	145,000	153	452
Kiwash Rural Power Co.	236,000	275	674
East Central Okla. Coop., Inc.	292,000	331	1,074
Central State Rural Elec. Coop., Inc.	130,000	155	402
South Carolina:			
Aiken County Rural Elec. Assn.	140,000	174	518
Tennessee:			
Meigs County Elec. Mem. Corp.	$ 30,000	32	103
Middle Tennessee Elec. Mem. Corp.	50,000	48	
Duck River Elec. Mem. Corp.	22,000	35	140
Texas:			
Nueces Electric Coop., Inc.	$184,00	252	592
Guadalupe Valley Elec. Coop., Inc.	166,000	198	572
Bandera County Elec. Coop., Inc.	154,000	202	460
Medina Electric Coop., Inc.	101,000	124	319
Virginia:			
Central Virginia Elec. Coop.	$212,000	166	726
Barc Electric Cooperative	81,000	69	269

Allotments for house-wiring and plumbing financing included the following:

	Amount
Arkansas:	
Ozarks Rural Elec. Coop. Corp.	$12,000
Georgia:	
Forsyth County Rural Elec. Assn.	10,000
Canoochee Rural Elec. Mem. Corp.	10,000
Kentucky:	
West Kentucky Rural Elec. Coop. Corp	5,000
Mississippi:	
Pearl River Valley Elec. Power Assn.	5,000
North Carolina:	
Anson Mutual Electric Corp.	20,000
Texas:	
Magic Valley Elec. Coop. Assn.	20,000
Denton County Elec. Coop., Inc.	3,000
Hamilton County Elec. Coop. Assn.	10,000
City of Seymour	5,000
Lyntegar Electric Coop., Inc.	10,000
Farmers Electric Coop., Inc.	6,000
Erath County Elec. Coop. Assn.	5,000
J. A. C. Elec. Coop Assn.	5,000

REA Adopts Group Purchasing Plan

The Rural Electrification Administration has arranged with all manufacturers of electric meters for a new group purchasing plan, whereby REA-financed cooperatives will benefit by substantial economies through buying in larger lots than were customary heretofore.

Briefly, the plan is this: REA will accumulate requests of its borrowers for bids on their individual meter requirements until such requests attain the volume on

Tubular Alcoa Aluminum Bus Bar

SIMPLIFIES THE CONSTRUCTION OF OUTDOOR STATIONS

Light in weight, Aluminum bus bar places less burden on supports. They can be few and widely spaced, and the structure itself can be lighter in weight, thereby effecting many economies in materials and labor.

Standard construction methods and simple, inexpensive fittings are used with Alcoa Aluminum bus bar, whether tubular, flats, channels or angles. Installations are attractive. They stay that way, because Aluminum weathers well and stands up under corrosive conditions encountered in most manufacturing processes.

Alcoa Aluminum bus bar offers a high degree of thermal, electrical and mechanical efficiency. Ask our engineers to assist you in selecting the material which best meets your needs. ALUMINUM COMPANY OF AMERICA, 2164 Gulf Building, Pittsburgh, Pennsylvania.

which manufacturers grant their greatest discounts and most favorable terms. Then REA will invite all the meter manufacturers to bid for the supplying of meters required by a dozen or so cooperatives, rather than having each firm bid on each individual order separately. In the past few months appropriate quantities of meters to qualify for such group purchases have been reached at about two weeks' intervals.

Will Not Handle Orders

REA will not handle any orders itself, nor will it buy or sell the meters. It will merely accumulate the requests until a sufficient quantity are on hand. It will then ask bids, not on its own behalf but for its borrowers, on the total of the individual requirements. The successful bidder will deliver meters direct to the projects in arcordance with the individual orders, and bill each cooperative for its portion of the group purchase at the unit price of the entire accumulated order.

This plan reduces sales cost to manufacturers, saves the time of a busy cooperative staff and gives farm people the benefit of large scale buying and production in the form of lower prices.

Wholesalers

Supply Co. Occupies New Home in Ft. Worth

Climaxing eight years of electrical wholesaling business in Fort Worth and surrounding territory, the Westinghouse Electric Supply Co. have moved into a new building located at 2nd and Jones St., Fort Worth. The new building was especially designed for Westinghouse and has features which make it one of the most modern combined wholesale warehouse and office.

The new building of Westinghouse Electric Supply Co. comprises 10,000 square feet of efficient warehouse space with an additional 2,500 square feet of space devoted to office use. The Fort Worth branch of Westinghouse Electric Supply Co. now employs twelve people, and with moving into the new building becomes a Class "A" branch. Every type of electrical supply is now stocked in the branch and a complete stock of all Westinghouse major appliances, radios, and lamps is maintained at all times.

One of the main features of the new building is the merchandise display room. Softly illuminated by the new metal bi-post totally indirect luminaires, a light intensity of 25 foot-candles is reached in the display room. The walls of the display room are painted a delphinium blue, the floor a battle ship gray, with an oyster white ceiling. All of this color combination serves to set off the complete electric kitchen which is installed at one end of the display room.

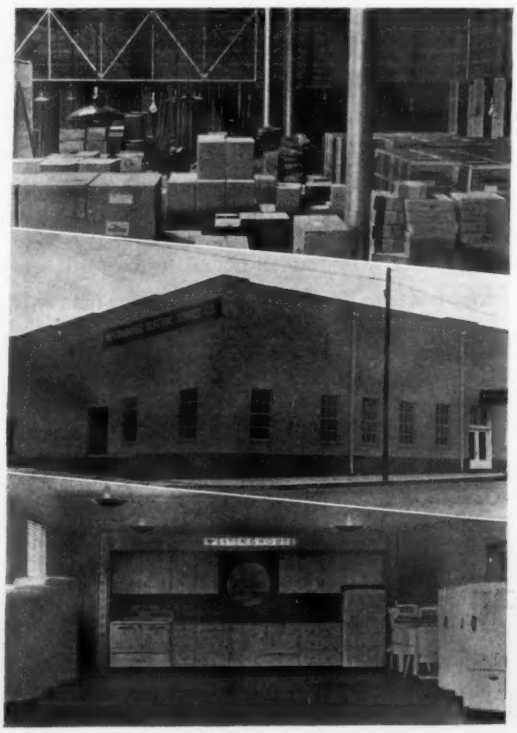
The offices located in this new building are illuminated with Westinghouse semi-indirect fixtures, providing 25 foot-candles of light on all desks. The office walls are finished in white with an off-white ceiling and natural hardwood floors. Lighting and ventilation are so designed in the offices as to provide maximum comfort for the employees at all times.

One important feature of the new Fort Worth branch is a separate "store within a store." Broken package supply items are sold over the counter to electrical contractors in the city of Fort Worth from this store. This "store within a store" helps speed up service to electrical contractors on "pick-up" items.

Another important feature designed to speed up service to Westinghouse customers is the location of the separate receiving and shipping departments with a loading dock which will accommodate eight trucks or two railroad cars.

A complete service shop has been installed in the Fort Worth territory office to take care of electrical major appliance service for Fort Worth dealers. The Westinghouse Electric Supply Co. does no retail business, but maintains a service organization for all Westinghouse dealers in metropolitan Fort Worth.

M. B. Coates is manager of the Fort Worth branch and C. D. Havens is manager of merchandise sales promotion.



Some of the attractive features of the new home of the Ft. Worth Westinghouse Electric Supply Company are shown at the right.

Graybar Announces Two Louisville Branch Promotions

C. S. Powell, formerly manager, of the Louisville branch of Graybar Electric Company, was recently transferred to the general department as assistant telephone sales manager. Mr. Powell has been associated with the Graybar Electric Company since 1914. He has served as manager of the

C. H. Brown C. S. Powell

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ELECTRICIANS — BUILDERS
Approve Specifications for
RACO·ALL-STEEL·PRODUCTS

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CUTOUT BOXES • CABINETS
FUSE CABS • CONDUIT FITTINGS

RACO•ALL-STEEL Galvanized Box Material complies with Federal Specification W.O. 821-A.

DESIGNED to meet present day wiring requirements economically and effectively, RACO•ALL-STEEL•PRODUCTS have won nationwide acceptance. They provide many advantages for *new* jobs as well as rural and urban modernization jobs.

Developed by competent engineers who keep pace with modern wiring trends, RACO•ALL-STEEL• PRODUCTS offer numerous improvements which are of importance to everyone in the building and electrical industries—for example: "Pry Outs," the modern knockout—"Extended Ears," the ideal new-work switch box—"Receptacle Boxes," properly gauged for mounting receptacles in plaster or baseboard—"Wall Bracket Boxes," to assure perfect alignment of side-wall bracket fixtures. "Twin-Bracket Boxes," oversized, positive alignment; rigid two-way support, "JAY-KAY" Clamps, external cable clamps, making full capacity of the box, available for splice—"Hi-Lo" Barriers, standard Raco•All-Steel Boxes may be used with this barrier, separating high and low voltage; "Two-Way" clamps, affording entrance to switch or outlet boxes through side or bottom knockouts *or both simultaneously*—and many others.

The total of more than 40 years of experience behind the products carrying the famous RACO and ALL-STEEL trade-marks is your assurance of continued quality and dependability. Write for catalog illustrating the complete line—there is no obligation.

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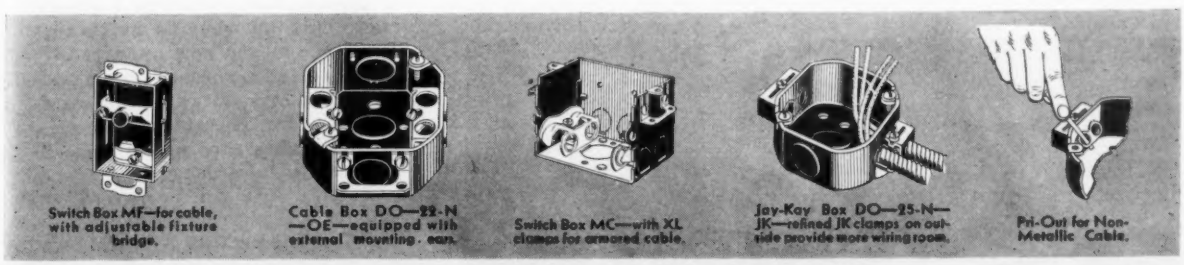


Switch Box MF—for cable, with adjustable fixture bridge.

Cable Box DO—22-N—OE—equipped with external mounting ears.

Switch Box MC—with XL clamps for armored cable.

Jay-Kay Box DO—25-N—JK—refined JK clamps on outside provide more wiring room.

Pri-Out for Non-Metallic Cable.

RACO • ALL-STEEL • PRODUCTS

SWITCH BOXES • OUTLET BOXES • CUTOUT BOXES

CABINETS • FUSE CABS • CONDUIT FITTINGS

Louisvile branch for the past ten years and previous to that appointment was sales manager and manager of the Nashville branch.

C. H. Brown, formerly sales manager of the Louisville branch, will succeed Mr. Powell as manager.

32 Carload Sales Follow New Model Previews

As a result of January previews of new appliances held in Charlotte and Raleigh by L. W. Driscoll, Inc., North Carolina distributors of General Electric appliances, their dealers placed orders for more than 2,000 refrigerators making up thirty-two solid carloads.

"Personalized dealing" with dealers is one of the reasons for this unusual record, according to L. W. Driscoll, owner of the firm.

Mr. Driscoll has developed a unique method of conducting new model previews. Instead of inviting all dealers to a single meeting, he invites various groups in each district at a specified time, endeavoring to gauge the number to coincide with the sales staff, so that each dealer will receive sufficient personal attention.

One of the features of the new model shows was a booth housing two contrasting exhibits arranged by D. C. Goff, sales promotion manager. One of the displays represented that of an imaginary firm called "B. Hind Tymes & Sons" which showed modern appliances in a jumbled up window display containing everything from chicken wire to crockery. The second display, designed as "Keen and Lively, Inc.," showed modern appliances arranged in an attractive fashion, utilizing the manufacturer's window display materials.

Employees Awarded Service Emblems for Thirty Years

Among Graybar employees recently awarded service emblems for completing thirty years of service with the Graybar organization were: A. J. McCall, manager at New Orleans; Stanley Zercher, manager supply department, Dallas; and Max Morris, salesman at Atlanta.

New Distributors for Stewart-Warner Corp.

Two new distributors for their electrical appliances were appointed in the South recently by the Stewart-Warner Corporation, Chicago:

David Kaufmann's Sons, Baltimore, Md., will distribute the Stewart-Warner line of radios.

Household Appliance Corporation, New Orleans, will distribute Stewart - Warner refrigerators, ranges and radios.

Memphis Distributor Adds New Appliance Lines

Davis Electric Supply Company, 661 Jefferson Street, Memphis, Tennessee, was recently appointed mid-south distributor for Gibson refrigerators, Admiral radios and Apex washers and ironers. W. B. Davis heads the firm as president.

New Wholesaling Firm Opens in Columbus, Ga.

P and W Electric Supply Company is the name of a new electrical supply wholesaling firm opened recently at 1518 First Avenue, Columbus, Ga.

Partners in the new firm are Jack M. Passailaigue and Will R. White. Both men are well known in the local electrical industry. Mr. Passailaigue was associated with the Georgia Power Company for eleven years and Mr. White was connected with the Walker Electrical Company, Columbus branch, for the past twelve years.

Charlotte Distributor Holds Open House

A dealers' open house meeting for inspection of the new Philco Conservador electric refrigerators was held during an entire week early in March by A. K. Sutton, Inc., of Charlotte, N. C., distributors for the new Philco refrigerator. Approximately five hundred dealers were expected to visit Charlotte and view the new line.

Attractive appliance display of L. W. Driscoll, Inc., Charlotte

Inspectors

Revisions for Busway Article Considered

The electrical committee, National Fire Protective Association, is now considering a proposed revision of Article 364 of the Nation Electrical Code, covering the subject of Busways. The proposed changes include the following:

In Section 3642 where busways are now limited for use only for exposed work in dry locations in industrial occupancies, garages and in office buildings of fire resistive construction, it is proposed that the new code section will permit busways for use for exposed work in any dry location.

In Section 3646, it is proposed that the term "extensions from busways" be changed to read "branches from busways." The section will also be changed so as to approve branches from busways made with busways as well as by the other means now approved by the Code and a phrase is to be added at the end of the section reading "or, for portable appliances, with suitable cord assemblies approved for hard usage."

Section 3648 will be revised extensively. The proposed new wording for this section is as follows:

"3648. OVERCURRENT DEVICES. Plug-in connection or devices used with cord assemblies for tapping off portable appliances from busways shall contain the overcurrent devices required for the branch circuit or appliance unless the busway is supplied from one of the branch circuits of Article 210 and in accordance with the requirements therein specified. Other plug-in connections or devices for tapping

off branches from busways shall contain the overcurrent devices required for the branch circuit, except as noted in Section 2434. Plug-in connections or devices shall be of approved types and, where not readily accessible, the overcurrent unit shall be enclosed or guarded until it is disconnected from its supply."

In Section 3649 covering the subject of marking, it is proposed that busways shall be marked with the voltage for which they are designed as well as current rating and the manufacturer's name or trade mark.

Jacksonville Commissioners Endorse Proposed License Law

Endorsement of a proposed state electrical license and inspection law was given recently by the City Commission of Jacksonville, Fla., on motion by Utilities Commissioner Ernest E. Anders.

The bill provides for the establishment of a non-political electrical administrative board, named by the governor, to be composed of five men, representatives of all branches of the electrical industry and the insurance underwriters.

It would guarantee uniform rules and regulations and uniform inspection methods and classification and licensing of all persons engaged in the business of installing electrical equipment.

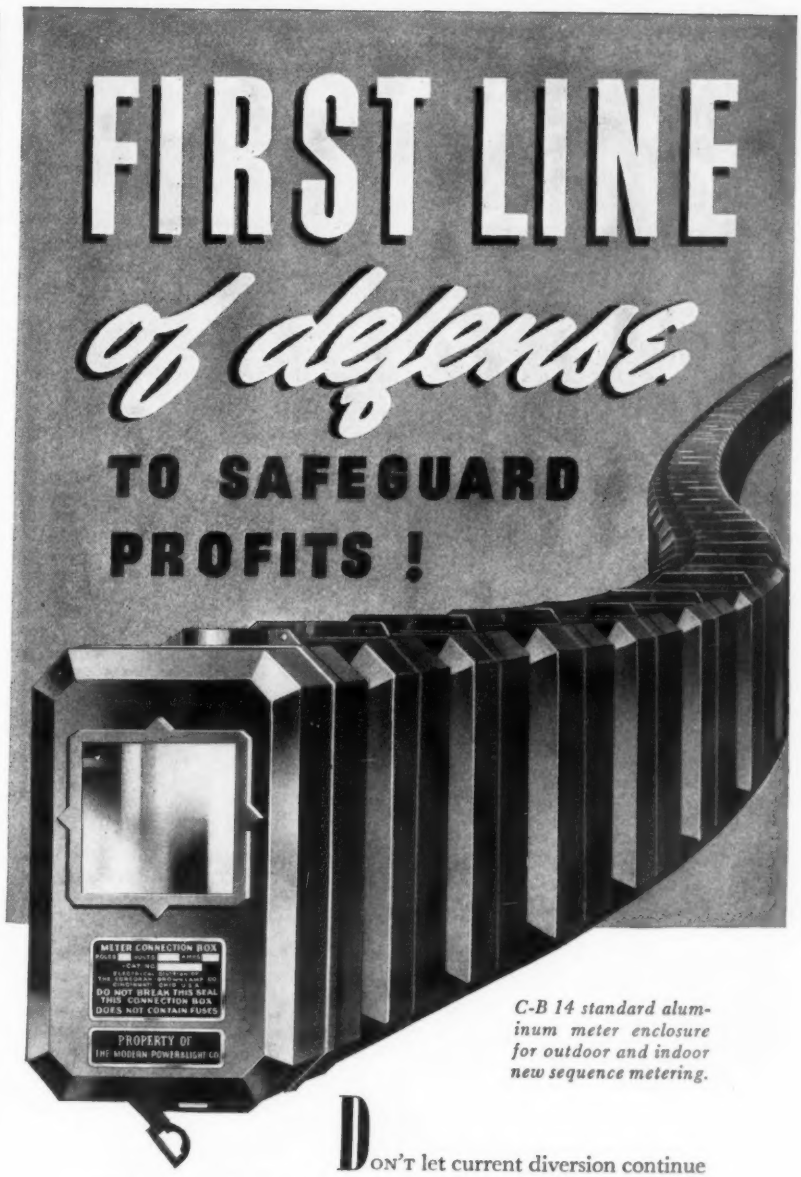
Copies of the resolution were ordered sent to the Duval County delegation in the State Legislature and to the Florida League of Municipalities with the request that as many other cities as possible be contacted and asked to take similar action.

The measure is proposed for introduction at the forthcoming session of the Legislature.

Louisiana Inspectors Discuss New Wire Tables

New wire tables was the subject discussed at the regular meeting of the Louisiana Chapter, International Association of Electrical Inspectors, held March 31, reports B. Z. Segall, secretary-treasurer of the chapter.

The tables discussed included the new tables of current carrying capacity of rubber-covered building wire in the code, performance, and heat-resistant grades as published last June in the final report of the NEMA sub-committee on determination of maximum permissible current carrying capacity of code insulated wires and cables for building purposes.



C-B 14 standard aluminum meter enclosure for outdoor and indoor new sequence metering.

DON'T let current diversion continue to cut into earnings! Lick this problem for all time with C-B tamper- and alteration-proof New Sequence Service Entrance Equipment, and prevent revenue losses. But C-B equipment does more than stop diversion. It modernizes every meter installation; places the meter in a position of high visibility, where it can be read quickly; sharply reduces installation time and labor; gives extra years of trouble-free service. The cost? Only a fraction of the current diversion losses themselves. Consult the utility trained C-B technical staff without obligation.

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MANUFACTURERS' News

National Campaign on Kelvinator Products

Keynoted by celebration of the Silver Jubilee of the household electric refrigerator, Kelvinator, pioneer company of the industry, is launching the most intensive spring selling campaign of its 25-year history, according to an announcement by J. Nelson Stuart, director of advertising and sales promotion of the Kelvinator Division of Nash-Kelvinator Corporation.

The campaign, now getting under way with a series of previews of the new Kelvinator Silver Jubilee refrigerators in showrooms in all parts of the United States, will be backed by an unusually heavy schedule of newspaper and magazine advertising, Mr. Stuart said.

Major features of the drive will be a nationwide Kelvinator birthday party, which will be held simultaneously in thousands of showrooms during the week of April 3; colorful showroom and window displays built about the Silver Jubilee refrigerators and based on the celebration of Kelvinator's 25th anniversary; local consumer contests, new "door-opener" ideas and gifts for use of salesmen, a special Silver Jubilee direct mail campaign, special broadsides, a carefully planned series of radio spot announcements, and educational activities of the Kelvinator National Salesmen's Institute, the company's new school for salesmen, in which nearly 2,500 have already enrolled.

Phelps Dodge Copper Gets Big Cable Order

An order for approximately $450,000 worth of power cable for use in the extension of the transmission and distribution system of the Jacksonville, Fla., municipal electric light plant was announced recently by Wylie Brown, president of the Phelps Dodge Copper Products Corporation, New York, N. Y.

The recently expanded plant facilities of the company's Habirshaw division at Yonkers will be used in filling the order, which calls for 133,000 feet or 25 1-4 miles of lead covered, paper-insulated cable of three-conductor design and 750,000 circular mils or 3 1-8 inches in size, one of the largest sizes manufactured today.

The cable is rated for operation at 21,000 volts, and is to be installed underground in four parallel circuits, thus providing a capacity of about 100,000 kilowatts.

Norge March Orders Increase over 1938

Orders on hand at the close of February business indicate Norge shipments of more than 50,000 units during March, according to a statement released by Howard E. Blood, president, Norge Division, Borg-Warner Corporation, and executive vice president of Borg-Warner Corporation.

"Production has been speeded up as far as possible to handle the heavy backlog of open orders," Mr. Blood stated. "If our anticipated shipment of more than 50,000 refrigerators, ranges, washers and ironers, is realized, this will constitute an increase of 169.5 per cent as compared with March, 1938, when Norge shipped 29,500 units."

Mr. Blood has just completed a coast to coast speaking tour in which he had the opportunity to discuss business conditions with hundreds of distributors, dealers, and salesmen. He found, generally, that wholesalers and retailers, alike, were of the belief that 1939 volume in the major home appliance industry would greatly exceed that of 1938.

New line of Standard electric ranges. (See next page.)

American Blower Initiates Spring Sales Campaign

"Comfort Cooling Builds You Up" is the slogan of American Blower Corporation's nation-wide spring advertising and promotion of "comfort cooling" products, according to C. T. Morse, president, who described the current campaign as the most extensive ever undertaken in this branch of the industry.

Metropolitan newspapers in key cities will be used. First advertisements in the campaign will appear in May. The program also includes direct mail and dealer helps, centering around a new "authorized dealer" sign to be displayed by each dealer.

Advertisements and direct mail will feature the new "comfort cooling" with fresh air as a way to obtain low cost summer comfort in the home, and to attract customers to places of business. Picture-caption treatment is used, developing the theme, "Comfort Cooling Builds You Up."

Standard Introduces New Range Line

Newly designed throughout, the Standard electric ranges for 1939 are of the cabinet type, finished in white porcelain enamel, with acid-resisting porcelain enamel cooking-top and blue-black porcelain enamel lined oven. Improved design of the "Even-Oven" is said to give exceptionally good baking results. Recessed burners add to the amount of usable oven space.

Surface burners are all five-heat Chromalox, providing all speeds from simmer to extra-fast. Portable cookers are standard equipment with some models and are available for use with all. Lamp assembly shows a new louver-type lamp. Either minute-minder or clock is available with the assembly.

News About People—

Donald S. Funk, vice president and general manager of the Sangamo Electric Company, Springfield, Illinois, was elected president and general manager at the quarterly meeting of the Board of Directors.

Mr. Funk succeeds the late Robert C. Lamphier as executive head of the company, which is one of the large manufacturers of electric meters, time-switches, sign flashers, and radio condensers. Mr. Funk started with the company 22 years ago, after graduation from Yale.

* * *

Harvey B. Jordan has been appointed vice president in charge of

operations of the American Steel & Wire Company, subsidiary of the U. S. Steel Corp. Mr. Jordan succeeds M. W. Reed, who has been made chief engineer for Carnegie-Illinois Steel Corp., another U. S. Steel subsidiary.

Mr. Jordan has been in the employ of the wire company for 25 years. He moved up through the ranks until he was named assistant vice president in January, 1937, holding that position until the present time.

* * *

Charles D. Spaid has joined the advertising department of the Edison General Electric Appliance Co., Inc., makers of Hotpoint home appliances, according to an announcement by W. A. Grove, advertising and sales promotion manager. He will be in charge of Hotpoint refrigerator advertising and sales promotion. Mr. Spaid has been engaged in promotional and advertising work within the electrical appliance industry since 1926. During this period he was associated with the General Electric Company, General Electric Supply Corp., and RCA Victor Corporation.

* * *

Donald A. Wood has been named manager of the advertising service division of the General Electric appliance and merchandising department, Bridgeport, Conn., succeeding R. W. Hart, who has resigned.

* * *

F. L. Wiley, well known throughout the Southeast as a washer and ironer specialist, has been appointed southeastern district manager for the Blackstone Manufacturing Co., of Jamestown, N. Y. Mr. Wiley will make his headquarters at Charlotte, N. C., but will cover eight southeastern states for the company.

At a recent meeting of the stockholders of A. J. Lindemann and Hoverson Co., Milwaukee, Wisc., **E. A. Lindemann** was elected president and

treasurer of the company, making him one of the youngest major executives in the industry. He continues his activities as general manager.

* * *

D. E. (Dave) Allen has been appointed southeastern district manager for Anaconda Wire and Cable Company, with headquarters in the Volunteer Life Building, Atlanta, Ga. Mr. Allen started with the Anaconda Wire and Cable Company seven years ago, and for the last four years has been in the executive offices in New York.

Mr. Allen is well known throughout the south having represented

another wire and cable manufacturer in the Southeast before his connection with Anaconda. He made his headquarters in Birmingham for several years.

* * *

The F. A. Smith Manufacturing Company, Inc., of Rochester, N. Y., has opened a southeastern district office in the Standard Building, Atlanta, Ga., with **S. C. Stockdale** in charge, according to announcement by George A. Sundre, vice president.

Mr. Stockdale comes to Atlanta from the Smith company's factory and will spend his entire time working with distributors in Georgia,

Florida, Alabama and Mississippi.

Mr. Sundre is making his annual trip through the South, calling upon distributors and arranging for the opening of several southern offices.

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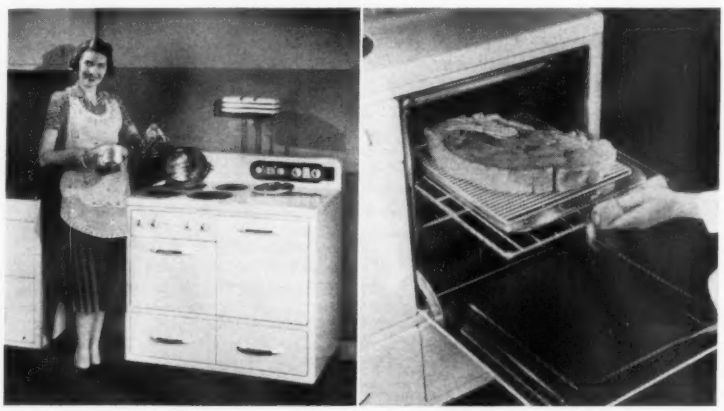
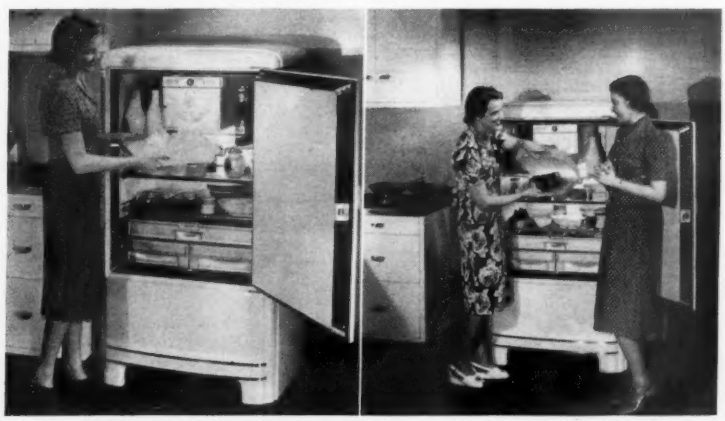


New convenience features on 1939 Frigidaire electric ranges and refrigerators are dramatized here. At left above, the lady is holding the new double duty Thermizer, a deep cooker equipped with cooking utensil and baking grid which can be used for preparing a complete meal or for small baking jobs. An outstanding feature of the 1939 Frigidaire refrigerator is the new meat tender made of special annealed glass and located directly under the freezing unit. Covered, but not sealed, it is designed to provide the correct amount of air for meat preservation.



W. H. Berry, Jr., manufacturers' representative, of Atlanta, Ga., will represent the Columbia Cable and Electric Company, Long Island City, N. Y., and the Cohoes Rolling Mill Co., of Cohoes, N. Y., in the southeastern territory.

* * *

The appointment of **C. G. Blackburn** as assistant sales manager of Standard Electric Manufacturing Corp., is announced by H. H. Venable, vice president in charge of

sales. Mr. Blackburn joined the Standard organization in January, 1938, and handled sales in southeastern states until August, when he was made manager of the central district with headquarters at the home office in Toledo.

Hotpoint's national and billboard advertising is brought right into the range showroom or display window, with the brand-new set-up display, made available by Hotpoint's advertising department, in time for use with Spring Range Showing displays. The 1939 advertising theme, "Be Thrifty—Be Modern," is headlined in eye-catching color. This display requires no feet or frames. It is printed in paint-poster process, in seven colors, on durable 100 point cardboard and is now available.

The address of the Shreveport, Louisiana, office of Allis-Chalmers Manufacturing Co., has been changed from 712 Ardis Building to 611 City Bank Building. **L. G. Park** remains as representative in charge.

* * *

V. A. Sheals, for more than 15 years a member of the cable section of General Electric's central station department, has been named assistant designing engineer of the cable engineering department. Since 1930, he was wire and cable specialist for the New York district. He received the Charles A. Coffin award recently.

CHROMALOX SUPER-SPEED RANGE UNITS

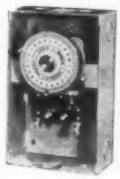
"Madam, this range has Chromalox units"

—there's the phrase that many dealers consider their best order-clincher. Use it —sell Chromalox-equipped ranges. Write our nearest representative for details.

ATLANTA, Ga.—C. B. Rogers, 1000 Peachtree St. DALLAS, Texas—Elgin B. Robertson, 1215 N. Zangs Blvd. RALEIGH, N. C.—W. R. Phillips. OKLAHOMA CITY, Okla.—Paul Berry, 3128 N. W. 26 St.

EDWIN L. WIEGAND CO., 7600 Thomas Blvd., Pittsburgh, Pa.

NEW 1939 MODELS
ALL ELECTRIC
TORK CLOCKS



"Turn anything electrical ON and OFF regularly"

For window lights, signs, air conditioning and heating equipment as well as industrial time control. Flush mounted models—Astronomic dials.

Representatives:
WILLIAM H. BERRY, JR. 88 PRYOR ST., S. W. ATLANTA, GA.
PAUL A. MICHLER 1814 ALLEN BUILDING DALLAS, TEXAS

Or Write
THE TORK CLOCK CO., INC.
MOUNT VERNON, NEW YORK

No. 191-A S.P. 1650 Watts $12.75 List

No. 962-A D.P. 4400 Watts $15.00 List

Specify Voltage and Cycles

C. B. ROGERS

ELECTRICAL HEATING ENGINEER
CHROMALOX
ELECTRICAL HEATING UNITS
and
CHROMALOX
EQUIPPED PRODUCTS

1000 PEACHTREE STREET
ATLANTA, GEORGIA

RE-MO-LITE CONTROLS

GOOD FARM LIGHTING INSTALLATIONS *pay big* DIVIDENDS

RE-MO-LITE is your best bet to make money on those Rural Electrification Projects, which are going on all over the country. Newly developed and perfected to give you simplicity and speed in wiring and yet giving tops in profit.
Specify RE-MO-LITE for customer satisfaction.
DROP A POST CARD TODAY FOR FREE BOOKLET, "FACTS ABOUT RE-MO-LITE," AND SATISFY YOURSELF.

20th Century Engineering Co.
MANKATO, MINN.

Automatic Kitchen Fan

An improvement in its deluxe line of automatic wall box kitchen vent fans in the form of a baffle plate is announced by the Signal Electric Manufacturing Co., Menominee, Mich. The baffle plate is said by the manufacturer to provide greater air delivery by reducing the turbulence around the fan blades thus materially increasing the efficiency of the fan as well as enhancing its appearance.

Apartment Model Fan

For use in the numerous homes so constructed that the installation of an attic fan is impractical, the Chelsa Fan & Blower Co., Inc., New York, N. Y., has introduced a fan designed especially for installation on the outer part of a window. Designated as the Chelsa Apartment Model Fan, the appliance is available in two sizes, 24 inch and 30 inch.

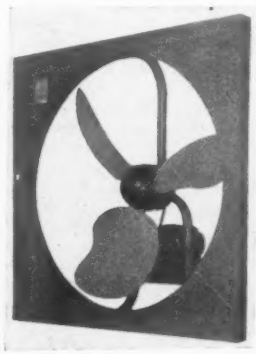
The fan rotates at very slow speed and blades have been designed to deliver a large volume of air with minimum noise. A metal awning protects the motor from outside conditions, and the fan is finished in durable weatherproof paint.

Modernaire Attic Fan

The Dallas Engineering Company, Dallas, Texas, announce the Modernaire line of attic fan units which offers many improved features. The new fan has all-steel, welded construction and is rust-proof. A variable pitch pulley is used which will give a speed variation of approximately 30 per cent. Also, a two-speed electric control is available at small extra charge. A sliding motor mounting is provided which gives automatic, constant adjustment, insuring longer belt life. The 36-inch fan in this line has a rating of 10,000 cfm and other sizes are proportionately high.

CirCOOLator Attic Fan

The Viking circulator attic fan manufactured by the Viking Air Conditioning Corp., Cleveland, Ohio, is now available in three sizes having capacities of 7,500 cfm, 11,500 cfm, and 16,500 cfm respectively. The fans are suitable for homes ranging in size from 7,500 cubic feet to 25,000 cubic feet.



Among the features of the new line are bullet-nose hub which combines the pulley, hub and bearing into one completely sealed, streamlined assembly; and the oddly shaped blade of "Helixoid" design for which the manufacturer claims extreme quietness and low power consumption.

These fans are available with complete attic package kits which include all of the fittings needed for attic installation, including low resistance ceiling grille, trap door with automatic switch and fire link, and vent-box with sound proof panelling.

Arctic Aire Fans

"Champions All" is the keynote of a new catalog describing the complete line of Arctic Aire Fans manufactured by F. A. Smith Mfg. Co., of Rochester, N. Y.

Featured in the catalog is the Arctic Aire Ambassador cabinet type fan. Available in 12-inch and 16-inch size, this unit provides a circular fan installed in an attractive furniture piece designed to blend with finest home furnishings. The units can be used either as a coffee table or as an end table. The fan draws in the coolest air from floor level and circulates it quietly and evenly throughout the room.

Also described in the catalog are the numerous models of desk type, pedestal type, and kitchen fans.

Comfort Cooling Fan

Quiet operation, easy installation, and high efficiency are some of the characteristics claimed for the new redesigned Coolvent attic fan manufactured by the Autovent Fan & Blower Company, Chicago, Ill. The fans are available in six sizes having capacities ranging from 4070 cfm to 21,100 cfm.

Through the use of carefully proportioned sheaves or pulleys and V-belt drives, the fans operate at slow speeds of from 281 rpm to 577 rpm, depending upon fan wheel diameters. The semi-enclosed motor is rubber mounted on a platform securely welded to a square sheet steel panel.

Self-Contained Air Conditioners

Supplementing the three-ton self-contained air conditioning unit produced last year, the Delco Frigidaire Conditioning Division of General Motors Sales Corporation announces the introduction of two new and larger self-contained units.

One of the new units, a five-ton machine designated as SC-500, presents a new feature in exact air distribution by "individual vane control" of the air outlet grilles. The unit is portable and occupies a comparatively small floor space measuring 44 inches by 22 inches. All controls are placed on a concealed but conveniently located panel.

The other unit is a ten-ton machine designed for use with easily installed supply and return air duct connections to the areas designated for conditioning. It differs from the five-ton unit only in its capacity.

Special Roaster Offer

A special combination offer recently announced by the Landers Frary & Clark, New Britain, Conn. includes a Universal electric oven and oven table at the special retail price of $29.95. The regular price of the combination would be $34.90.

The Universal oven is finished in white baked enamel trimmed with black, with stainless steel bands. The interior is porcelain enameled and the weight is 35 pounds.

The table is rigidly constructed of heavy gauge steel with joints electrically welded. The top has rounded corners and two shelves are provided for cooking utensils. Finished in baked white enamel, the table is 30 inches high, 20 inches deep and 15 inches wide.

Two-Gallon Water Heater

For low-cost water heating by electricity in cottages, filling stations, drug stores, and similar locations, General Electric appliance and merchandise department, Nela Park, Cleveland, Ohio, has announced the "Rocket" G-E automatic electric water heater, with a two-gallon capacity.

Portability and easy installation characteristics make the new water heater applicable to any place requiring small quantities of hot water periodically. It is a non-pressure, "push through" heater with many of the same features to be found in all of the larger G-E automatic water heaters, including the Calrod thrift heating unit.

The Calrod heating unit is of the immersion type and may be obtained in 600-watt or 1150-watt size. The heater is equipped with a thermo-snap, adjustable from room temperature to 190 degrees. The spun copper, rust-proof tank is contained in a steel outer case, finished with white baked Glyptal enamel. A nickel-plated copper hot water outlet is provided at the bottom of the tank.

Catalina Coffee Maker

The Silex Company, Hartford, Conn., offers a new model glass coffee maker—the Catalina Model. The cover, decorative shell and stove base of this coffee maker are finished in silvery satin chrome which presents a soft, non-tarnishing finish. The bowl handles are ivory Moldex.

The electric model lists at $8.45 in the six and the eight-cup sizes and $8.95 in the ten-cup size. The kitchen model lists at $5.95 in the six and eight-cup sizes and $6.45 in the ten-cup size.

Super-Speed Range Unit

The new 3-ring, 2000-watt, 230-volt Chromalox Super-Speed range unit recently announced by Edwin L. Wiegand Company, Pittsburg, Pa., is designed to produce five different heats when used with a 5-heat switch

and conected to a 3-wire service. The unit is of concentric ring design, with all-flat top and a cooking area 8 inches in diameter.

The wattage drawn by the element in the five different switch positions are: 2000 watts, 1400 watts, 600 watts, 350 watts, and 125 watts.

Adjust-o-matic Hand Irons

Two new hand irons have been added to the Westinghouse line of Adjust-o-matic irons; the "Pacemaker," a streamlined automatic iron, and the "Standard," a 700-watt automatic iron.

(FA) AC Circuit Breaker Type Service Equipment

MUCH HANDIER for the HOME OWNER

"When the Lights Go Out"

In addition to their unusually neat appearance, these (FA) AC Circuit Breaker Type Service Equipments are much handier to operate "when the lights go out" . . . When a short circuit or overload occurs, the circuit breaker automatically trips and causes the operating handle to move to the "OFF" position . . . The thermal element resets itself automatically — so that when the cause of the short circuit or overload has been removed, service is restored merely by returning the handle to the "ON" position . . . Operates like an ordinary tumbler switch.

For 120 volt AC service, with main lugs, up to six circuits . . . Single pole for Lighting and Branch Circuits — Double pole for Range, Water Heater and Sub-feeder Circuits.

Write for full information — ask for Bulletin No. 58.

Frank Adam
ELECTRIC COMPANY
ST. LOUIS

HELP WANTED

Sales are mounting on FREDERICK ANTHRACITE AND BITUMINOUS STOKERS; we need immediately, dealers to represent us in good territory still open. Good profits assured on this modern, priced-right and fast selling line.

Want details? Clip the coupon to your letterhead and mail to get our Stoker Sales Plan. No obligation.

THE FREDERICK IRON & STEEL COMPANY
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Without obligation, submit to me your Liberal Dealer Proposition.

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Special features of the Pacemaker are a heat-control lever marked with names of fabrics, base designed to concentrate heat in the ironing surface, and "fatigue-proof" sloping handle. This iron weighs five pounds and is rated at 850 watts.

The new Standard iron has the same type of heat-control lever as the Pacemaker. It also features the "fatigue-proof" sloping handle which allows the arm of the user to fall in a more natural, comfortable position. The iron weighs six pounds and is rated at 700 watts.

New G-E BX Cable

A new armored cable, called G-E Blue-Bushed BX, has been announced by the General Electric conduit products sales section, Bridgeport, Conn. This cable employs an S-shaped paper wrap, which has been found to increase the dielectric strength of the cable's insulation and makes it easier to use.

G-E Blue-Bushed BG can be stripped easily. As soon as the armor is removed bushings can be inserted immediately between the paper and the armor. The conductors then can be untwisted and the paper torn off close to the bushing.

"Twist-Tite" Outlets

A radically new kind of convenience outlet, designed to eliminate the annoyance and inconvenience of

plugs falling or pulling from their outlets, is now available from Harvey Hubbell, Inc., Bridgeport, Conn.

Designated as the "Twist-Tite" convenience outlet, the new outlet grips the cap tightly so that it cannot fall out accidentally because of slight tugs on the cord.

Capacitor-Start Motors

The type FJ capacitor-start, fractional-horsepower motors manufactured by the Westinghouse Electric & Manufacturing Company for refrigerators, water coolers, stokers, pumps, and such applications, are now available in sizes from 1-8 to 3-4 horsepower at all standard speeds for operation on either 110 or 220 volts. Motors rated 1-3 horsepower and larger are of dual voltage type.

Features of this line include: long-life automatic starting switch; "no-bump" bearings absorbing end-thrust shocks; three-way conduit box simplifying wiring; silent, cool-running rotor; sturdy, lightweight frame and primary; and specially machined brackets.

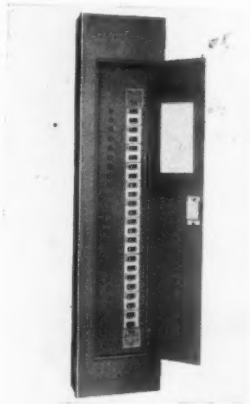
Combination Tape

The advantage found in both friction tape and splicing compound have been incorporated in a single product recently introduced by the Mechanical Goods Division, United States Rubber Co., New York, N. Y. Designated as Twinsulation tape, the new product is adaptable to all kinds of electrical work.

Because of Twinsulation's high dieletric strength, the manufacturer reports, less tape need be applied than is the case with ordinary friction and rubber tape. For example, a splice made with two piles of Twinsulation tape will withstand a test voltage of approximately 12,500 to 15,000 volts.

Industrial Lighting Panel

The Square D Company, of Detroit, Michigan, has extended the Multi-breaker line to meet special lighting panel requirements of the industrial field. The type LX is built to fit into the recesses of H-beams commonly used in the construction of modern plants.



These narrow panels are available in two sizes for either 8-inch or 10-inch beams. The circuit breakers are type-M Multi-breakeRs and can be furnished in single and double-pole branches up to 50-amperes capacity.

Armature Balancing Ways

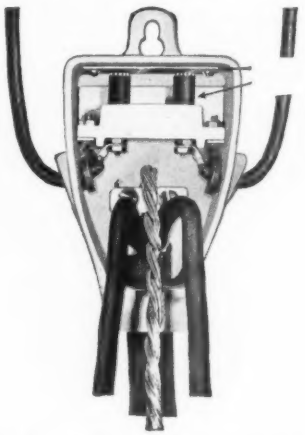
A compact, handy unit for the static balancing of motor armatures has been introduced by the Ideal Commutator Dresser Co., Sycamore, Ill. No centers are required for balancing as free turning semi-steel discs mounted on precision ball bearings carry the amature.

The standards which support the revolving discs are adjustable to any size armature within the limits of the machine. The units are available with 10-, 20-, or 42-inch swing, having capacities of 300 lbs., 1000 lbs., and 1,000 lbs., respectively. They are available in many shaft lengths.

This tool can be used for the balancing of crankshafts, pulleys, flywheels, etc., and for the supporting of armatures while rewinding or undercutting. Further details are available from the manufacturer.

Meter Protective Device

The M and W Electric Mfg. Co., Inc., of East Palestine, Ohio, has recently designed an over-voltage and lightning protective device for watt-



hour meters. The No. 950, illustrated here, is a combination weatherhead and protector. Surges caused by high voltages or lightning are shunted through the special resistors to ground.

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Mayfair"
CENTER OF ST. LOUIS BUSINESS
"Fine, that's near my office"
Over 50% of all rooms $3.50 or less, single; $5.00 or less, double

DOWNTOWN ST. LOUIS AT YOUR DOORSTEP
HOTEL
Kennox
NINTH & WASHINGTON
Over 50% of all rooms $3.50 or less, single; $5.00 or less, double

Technical Program Planned for Southwest AIEE Meeting

(*Continued from page* 47)

Myril B. Reed, Armour Institute of Technology, Chicago.

Signalling over zero Sequence Network, J. D. Browder, Oklahoma Gas and Electric Company Oklahoma City.

Wednesday, April 19, 9:00 A. M., Student Session.

Presiding: W. C. Morris, A. and M. College of Texas and A. J. McCrocklin, University of Texas.

Papers from Student Branches of Oklahoma A. and M. College, Kansas State College, Texas Technological College, University of Oklahoma, and Southern Methodist University.

Wednesday, April 19, 12:15 P. M.

Luncheon conference for Counselors and Branch Chairmen.

Wednesday, April 19, 1:30 P. M., Technical Session

Presiding: L. E. Cook, Texas Power and Light Company, and H. M. Stewart, Humble Oil and Refining Company.

Recent Developments in Generator Voltage Regulation, C. R. Hanna, K. A. Oplinger, and C. E. Valentine, Westinghouse Electric and Manufacturing Co.

Combined Voltage and Phase Angle Control Under Load, H. L. Reynolds, Allis-Chalmers Manufacturing Company, Dallas.

Symposium: *Operating Experiences of Utilities with Rural Lines.* Leader: Bryce Brady, Oklahoma Gas and Electric Company, Enid. Contributors: P. H. Underwood, Houston Lighting and Power Company, Houston; G. W. Bean, Texas Electric Service Company, Fort Worth; N. B. Gussett, San Antonio Public Service Company, San Antonio; R. R. Miner, Kansas Gas and Electric Company, Wichita; C. M. Lytle, Kansas City Power and Light Company, Kansas City; L. E. Cook, Texas Power and Light Company, Dallas; E. B. Jennings, Southwestern Bell Telephone Company, Dallas.

Expulsion Tubes Greatly Reduce Flashovers

(*Continued from page* 46)

ance might cause tripping of the line because the current value is below the minimum rating of the tube without leaving any visible sign except possibly a burned target. However, 35 of the 48 tripping operations involved one or more of the instantaneous phase relays requiring minimum operating current of 528 amperes, which is well above the minimum operating current of the tubes on the wood H-frame section of line. Seven of the remaining operations were by overload relays with a setting of 120 amperes, but it is believed that the long time setting of these relays would allow considerable damage to the tube and conductor due to the follow current. The remain-

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600 outside rooms. All with bath and circulating ice water.
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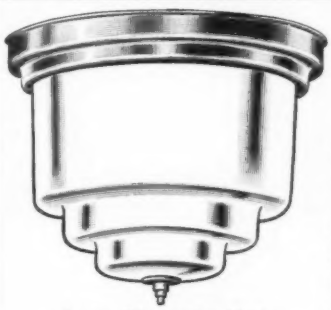
J. LESLIE KINCAID, President



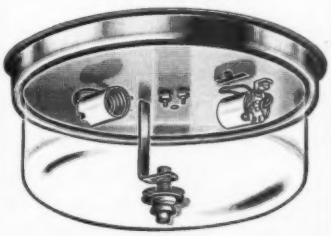
A new Distinctive Unit

Add New Customers

AND INCREASE YOUR PROFITS WITH A SUPERIOR LINE THAT IS CONSTRUCTED TO MEET EVERY REQUIREMENT.

A COMPLETE LINE PRICED FOR VOLUME SALES

The 1008 Series



ASK YOUR WHOLESALER ABOUT THE MANY OUTSTANDING FEATURES — A FEW OF WHICH ARE ILLUSTRATED OPPOSITE — OR WRITE TODAY FOR COMPLETE INFORMATION.

THE GLEASON SALES CO.
35-37 S. DESPLAINES STREET, CHICAGO, ILLINOIS

ing 6 operations were by the instantanous ground relay which has a setting of 180 amperes. Some or all of the latter 6 operations may have been caused by failure of a tube to extinguish the arc, but no proof of this has been found in the operating record.

A number of the tubes were removed after 4 years of service and returned to the manufacturer for inspection and measurement. No report of the findings of this inspection has been received to date.

The chart showing all tube operations on both sections of the line indicates that some protection is afforded the line by trees along the edge of the right of way (see Fig. 2). At several points on the line a number of tube operations occurred on each side of a wooded section when no operations were recorded for the structures in the wooded section.

Tube Ratings

From Laurinburg to tower No. 357, or about half the distance to Lumberton, the tube rating is 2500 amperes maximum to 600 amperes minimum. From tower No. 358 to Lumberton on the steel tower section and from Lumberton to Abbottsburg on the wood H-frame line, the tube rating is 1600 amperes maximum to 350 amperes minimum.

Tube Failures

Soon after the tubes were installed, one of them failed on the steel tower section near Laurinburg. This was a tube with a 350 ampere minimum rating which had been installed by mistake in the section of line requiring a minimum rating of 600 amperes.

On January 26, 1936, one tube failed at tower No. 256, about three miles from Laurinburg. This failure was caused by a change in the external gap setting due to the line conductor being pulled out of its normal position when replaced after a breakdown.

On March 26, 1938, three tubes failed at tower No 359, which is two spans beyond the point where the tube rating changes from 2500—600 amperes to 1600-350 amperes. A power follow current in excess of the expulsion tube capacity might have caused this failure, although no other failures have occurred in this vicinity.

External Tube Flashover

It is evident that most of the conductor burning that has occurred on the steel tower line has been caused by flashes which were outside the tube because no serious conductor burning has been reported on the wood pole section of the line where external tube flashover has been very rare. Some of the conductor burning which has been repaired recently may have occurred prior to the installation of the tubes, but it is impossible to determine from the operating record how much of this damage has been caused by flashes during the period of operation with the tubes.

Flashover outside the tube seems to be the most prevalent cause of line trip-outs and it is believed that most of the trouble of this nature has occurred on the steel tower section of the line.

Summarizing this study of the operating record of the line, it seems evident that the tubes have been highly efficient in reducing line trip-outs due to flashover on the wood H-frame line but leave room for improvement in the accomplishment of this end in the operation of the steel tower line. However, damage to insulators and fittings due to flashover on the steel tower line has been greatly reduced and it is believed that installation of the armor rods will practically eliminate conductor burning. Although it is expected that some line trip-outs will be caused by flashover outside the tubes, the Company does not plan to make any changes in the mounting of the tubes at present.

Understanding and Using The National Code

(*Continued from page* 43)

ment, and (3) granting special permission.

This statement is further amplified in suggestive procedure for those cases which may require the enforcing authority to seek aid from other sources. His interpretations may thus be tempered with the broader experience of the entire industry as reflected through the clearing house work of the Electrical Committee. He is given a definite basis for judging the relative merits of new materials and equipment by requiring the proof of their worth to be the manufacturer's burden.

The fundamental rules for safeguarding electrical installations are most important. As an example, section 2551 gives a concise statement as to the requisites for good grounding. A thorough understanding of these principles would do much to eliminate many controversies and arguments. The indiscriminate use of two artificial grounding electrodes on isolated systems and even on many

ELECTRICAL ESTIMATE BLANKS

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WANTED

Manufacturer's representative for several of the southern and southwestern states to represent an established manufacturer of entrance service cable fittings, ground fittings, rods, and conduit fittings. Address Box 63, care ELECTRICAL SOUTH, Grant Bldg., Atlanta, Ga.

MANUFACTURERS REPRESENTATIVE covering Southeast States needs additional lines. Reply to Box 62, care ELECTRICAL SOUTH, Grant Bldg., Atlanta, Ga.

"tied-in" systems often will not conform to the tenets set up in this fundamental rule. The fundamental rule establishes once and for all times the objective to be obtained by any method, any equipment or any installation to safeguard both life and property.

This introduction to the code has filled a long felt need for a definite statement of policy and action. It is a clear, straightforward exposition of what may be expected from the code. It asks us to keep in mind that any of man's creations cannot be perfect, but with tolerance, straight thinking and unanimity of purpose the final results obtained can accomplish the greatest good for the greatest number—many safe and adequate electrical installations.

What Profit On U. S. Construction Work?

(*Continued from page* 20)

If a government contract is obtained at a reasonably adequate figure, the execution of it at a profit then depends upon the dispatch used in ordering and shipping materials, and in disposing of labor, Mr. Stowers believes. His own operations are good examples, in that one of his first criterions is a complete lay-out, avoiding being dependent upon a sub-contractor or anyone else to do part of the job.

Timing, he believes, is most essential in order to complete a job on schedule, and to avoid tying up money and equipment, and the difficulty of accurate timing is increased if the contractor is depending on any other factor other than his own resources. The Montgomery Electric Company, Mr. Stowers' organization, is one of the most completely equipped in the South, having offices, showrooms, warehouse and garage under one roof, storing hundreds of line tools, trucks equipped with winches, and every item of equipment needed to speed up installation. He states very plainly that government contracts are likely to give trouble to a contractor not properly equipped, or whose bids are not based on a sound cost estimate.

"Keep your money from getting tied up" is one of his slogans, and this important factor is achieved by a judicious spacing of equipment orders so that they arrive only as needed. On out of town jobs, this detail is even more carefully planned, so that no temporary warehouse is necessary, all materials being used immediately upon arrival.

An example of this procedure was Stowers' recent job of revamping the municipal distribution system of Dothan, Alabama, which presented many difficulties in superimposing the new system over the old without at any time cutting off the power. The job was completed in the specified 100 days at the contract price of $30,000 without casualty, and was done with the Montgomery warehouse as headquarters, materials being ordered delivered on the date needed, obviating any need for local warehousing, or tying up of money in materials before they could be installed.

Mr. Stowers' attitude toward government work is summed up in likening it to riding a bicycle on a tight-rope. The principles of riding are the same as on the road but they must be applied more carefully—and mistakes are costly!

SIGNAL TIMERS

for

Starting and Stopping Industrial Work
Marking School Class Periods
Sounding Municipal Time Signals, etc.

Furnished with from one to six permanently set signal periods, for any times desired, but more than five minutes apart. Additional signal periods at little added cost. The schedule can be changed at the factory any time a different program is wanted.

$30.00

With addition of *both* a "Manual Control" and "Sunday and Holiday Cutout", $35.00.

Automatic Electric Mfg. Co., Mankato, Minn.

The "Handbook of Interior Wiring Design"

This valuable new handbook is the first standard of wiring adequacy equally acceptable to all branches of the electrical industry and is sponsored by the eight National Associations. It fills a long-felt need in dealing with the problem of inadequacy in wiring capacity and the handicap it places on electrical progress.

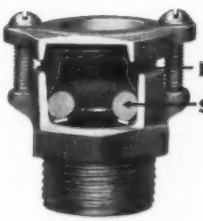
In preparing this Handbook, the authors have endeavored to create a reference book of value to the designer of those installations not normally handled by a consulting electrical engineer or by firms that undertake large special structures and maintain engineering staffs.

In general, the Handbook discusses "why" adequate wiring is needed, "what" must be installed to supply those needs, and "where" it should be placed. It is distinctly not a booklet on "how" to wire in the sense of covering specific wiring materials and their installation. Every effort has been made to include all of the factors that enter into the smaller job while only an outline of proceedure has been given for larger installations.

This valuable handbook is free with a 3-year subscription to ELECTRICAL SOUTH for $2.50 or with a 5-year subscription for $3.50.

ELECTRICAL SOUTH

GRANT BLDG. ATLANTA, GA.



RUBBER BUSHING
SEALING COMPOUND

OUR Double Seal Entrance Service Cable Connector gives your outdoor meters double protection, because with it, you do not depend on the rubber bushing alone. We use the conventional rubber bushing plus a ring of plastic sealing compound. This combination makes a 100% watertight fitting.

Simply push the cable through the connector and tighten down the screws. This compresses the rubber bushing around the cable, and at the same time forces the sealing compound around the cable, making a seal which is water tight.

Sample and descriptive matter upon request.

The M & W ELECTRIC MFG. CO., INC.

EAST PALESTINE, OHIO

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